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XI

MARINE ALGÆ OF THE REVILLAGIGEDO ISLANDS EXPEDITION IN 1925[1]

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The species of marine algæ enumerated in this paper were largely collected by Herbert L. Mason and other members of the expedition sent out by the California Academy of Sciences in 1925. Since, however, there are a very few marine algæ known from Guadalupe Island, it seems best to include such as have become known to us with the very considerable additions we are enabled to make as a result of our study of the present collections. No marine algæ were previously known to us from any of the Revillagigedo Islands.

From Guadalupe, a few marine algæ were brought back by Dr. Edward Palmer from his visit there, February to May, 1875. So far as we are aware, no list has ever been published, although Farlow (1877, p. 235) states that several interesting forms had been collected. One specimen, later named *Sargassum*

[1] EDITOR'S NOTE.—This is the thirteenth paper published in the Proceedings of the California Academy of Sciences based wholly or in part upon collections obtained by the Academy's Expedition to the Revillagigedo Islands in 1925. The first eight appeared in Vol. 15 of the Proceedings, one appeared in Vol. 18, and three in Vol. 19.

Palmeri by Grunow, (1915, p. 338), was distributed by Farlow, Anderson and Eaton in their *Algæ Exsiccatæ Americæ-borealis* (Sub No. 102) and two other species have been located in Herb. Farlow at Harvard University and in Herb. D. C. Eaton at Yale University. Palmer's collections of plants were determined and the results published by Sereno Watson (1876), who makes no mention of any algæ.

Watson quotes from Palmer's notes some matters concerning the climate which are of interest as to distribution of marine algæ as well as of land plants. There seems to be a chilling effect produced by the often prevalent northwest winds, even in summer. Fogs are prevalent, particularly at the northern end, where the spring vegetation may be as much as two months behind that of the more sunny cañons of the southern portion. In the winter, ice may be formed to the thickness of an inch and snow falls in the middle of the island (Mt. Augusta, alt. 3900 feet). Watson considers the flora as northern for the latitude and similar to that of California and lower Oregon. The chilling, at least of the more shallow waters, makes evident some peculiarities of distribution of the marine algæ, which will be discussed later.

Dr. Palmer visited Guadalupe Island again in 1889, between the dates of March 27 and April 3. There is no information available as to whether he collected any marine algæ on that trip.

In May, 1897, T. S. Brandegee visited Guadalupe with the crew of the Wahlberg (see Brandegee, 1900) and with his nephew, A. L. Stockton, made collections of plants including a few marine species. We mention these in our account.

While the collections of algæ brought back by the Revillagigedo Expedition are not of ample specimens, careful search has shown a much larger number of species than seemed possible on first sight. Most of them are small and few of them represented in duplicate, but it has seemed best to record them as fully as possible because of the geographical location of these outliers of the North American continent, and because of the difficulty of frequent visitation of their localities.

The Journal of the Revillagigedo Expedition (see Hanna, 1926), states that the U. S. mine sweeper *Ortolan,* which carried the party, arrived at Guadalupe Island at 2:30 p. m. on April 19, 1925, and left at 10:00 a. m. on April 22, 1925. On April 20, the party made four dredge hauls from the sandy bottom of South Bay, in the early morning. No farther report of collecting is made in Hanna's account, except that the "lava reef" near South Bay was explored for fishes, and on April 22, a party also collected fishes along the eastern shore. The small collections of algæ were doubtless made along with the fishes. When dynamite was used, fragments of seaweeds as well as fishes came to the surface of the water. The water temperature is given as 61°F. (16.1°C.+). Of the collections of marine algæ from Guadalupe Island, Mr. Mason tells us that a jar of calcareous nodules contains the collections from "Northeast Anchorage," and that the rest of the collections are from the vicinity of South Bay. The calcareous nodules consist largely of *Lithothamnium validum crassiuscula* Foslie, forming concentric layers over itself and centering about small fragments of shell. With it are *Litholepis accola* Foslie and *Lithoporella pacifica* Foslie. The nodules are commonly overgrown with *Peyssonellia rubra* (Grev.) J. Ag.

On April 24, Alijos Rocks, about 250 miles south of Guadalupe, was visited, shots of dynamite were exploded for killing fish, and "a few seaweeds which came up were collected." These did not reach us, at least according to labels. The surface water was 67°F. (19.4°C.+).

The expedition arrived at Sulphur Bay on the south side of Clarion Island, most westerly of the Revillagigedo Islands, and about 600 miles south of Guadalupe Island, at 7:30 a. m., April 26. Much of the island is surrounded by "growing coral reefs." Considerable dredging was done and seaweeds were obtained from depths down to 200 feet. Seaweeds were also collected close to shore. From the dredgings, few of the various seaweeds were obtained, the most conspicuous of which is described by Hanna (p. 37) as follows: "Long, slender stalks, round in cross section and bright green in color." "The sailors called it spaghetti." Since the collec-

tions were placed in alcohol and stored in casks with the fish collections, the main mass has been overlooked or lost in unpacking, so that the nature of the "spaghetti" remains a mystery. It is undoubtedly some species of *Codium* and probably identical with Mason's No. 16, which we are referring to *Codium decorticatum* (Woodw.) M. A. Howe. The bulk of the algæ collected, both at Guadalupe and at Clarion, Mr. Mason says came up on the anchors when raised, but some were collected in tide pools on the coral beach. *Sargassa* and a floating kelp were also collected but have not come into our hands. There was greater amplitude of tide experienced at Clarion than at Guadalupe, where it was slight at the time of the visit. The expedition left Clarion Island at 5:00 p. m. on May. 1. At 8:00 a. m. it was at Roca Partida, "a strange pinnacle about 60 miles west of Soccoro Island," another member of the Revillagigedo group. No collection of algæ seems to have been made, although Hanna (p. 42) says: "Coralline algæ (red and pink in color) grow on the walls in the wash of the sea."

Although the expedition spent from 4:00 p. m., May 2, to 2:00 a. m., May 12, on Soccoro Island and about 12 hours on San Benedicto Island, the easternmost of the Revillagigedo group, no collections of algæ were made, the shores being unfavorable for collecting.

A very few species were collected nearer the mainland of Mexico, but they are included.

The number of species segregated from the various masses of material and deemed worthy of mention totals 125. Of these, 9 have been determined only as to genus, being included in our list only to call attention to their occurrence. Of the 125 species, 98 occur on Guadalupe Island, 30 occur on Clarion Island, with only 5 species common to both, while 4 species are recorded from Maria Madre Island of the Tres Marias group.

Of the algæ studied, we have described 2 new genera, both from Clarion Island, 29 new species (22 from Guadalupe and 7 from Clarion) and 2 new varieties, both from Guadalupe. Including species described previously, 27 species are known

at present only from Guadalupe Island and 7 only from Clarion Island. The 2 genera and 34 species may be considered, for the present at least, to constitute an *endemic* element.

The non-endemic species of the islands of Guadalupe and Clarion number 80 (114 less 34). Of the 80 non-endemic species and varieties, 43 have been reported from the eastern Pacific Ocean (north and south), and 26 from the middle or western Pacific Ocean (north and south). As to the Indian Ocean, there are 26 species in common with the marine flora of the East Indies, now so carefully elaborated by Dr. Anna Weber-van Bosse, and even 13 with the comparatively unknown marine flora of the western Indian Ocean. With the little known marine flora of the Red Sea, there are 8 species in common and with the comparatively well known Mediterranean marine flora, 19 species in common. With the marine floras of the Atlantic Ocean there are 34 species in common with the eastern Atlantic, and with the west Atlantic, chiefly with the West Indian region, 36 species in common, of which 6 species seem confined to the Caribbean Sea and these islands of the eastern Pacific.

One of the most surprising distributions is that of *Halothrix lumbricalis,* which is local in western Europe, northeastern North America, and Guadalupe Island. It seems to occur in May and has been collected only about this time of year in all three sets of localities.

Since the previous sentence was written, Yamada (1928, p. 513, fig. 12) has published a description and illustrations of his *Halothrix ambigua,* from Asamuslie, Oshima, Oma, in Mutsu Bay, Japan, collected in May, 1927. Yamada's species is very different from the Guadalupe plant, having free filaments of about twice the diameter. It has also unilocular sporangia surrounded by curved, clavate, multicellular paraphyses after the fashion of *Elachistea.* If retained in *Halothrix*, the Japanese plant must be placed in another section of the genus from *Halothrix lumbricalis,* unless, as seems at present most unlikely, similar unilocular sporangia and paraphyses are discovered in *H. lumbricalis.* The Japanese plant

seems to show a combination of *Elachistea* characters (more compact basal portion with unilocular sporangia and curved, clavate, multicellular paraphyses) and those of *Halothrix* (plurilocular sporangia, or gametangia?, intercalated on the erect free filaments).

Another striking case of discontinuous distribution is that of *Sporochnus pedunculatus,* since our Guadalupe species seems to be referable rather to the Atlantic species than to any of the species described from the south Pacific region. Two most problematic species have been referred dubiously to *Eisenia.* They seem to be disrupted sporophylls, one bearing sori, but no trace of the plant which, if our surmises are correct, must have borne them has been seen.

The occurrence of what seems undoubted *Acetabularia parvula,* a characteristic East Indian species, at Clarion Island, while far out of its previously known distribution, may be explained by its small size and likelihood of being overlooked in intermediate localities.

The waters about Guadalupe Island are cooler than those about Clarion. In the spring they are as low as 61°F. (16.1°C.+), while at the same time of year those about Clarion Island are at least over 67°F. (19.4°C.+), probably even over 20°C. or even higher. At the coldest, the waters about Guadalupe Island are probably 15°C. (or below), those of Clarion Island are probably never much, if any below 20°C. Judging from temperature charts, Guadalupe waters vary seasonally between 15°C. and 20°C., while those of Clarion are probably never below 20°C. and advance to 27°C. or 28°C. It is to be regretted that the collections from Clarion Island are not more ample, but such as have come to us seem to indicate a more purely tropical character of the flora than do those of Guadalupe.

The accompanying table, while imperfect, indicates the general relations between the two islands and to other oceans and seas.

	E. Pac.	W. Pac.	E. Ind.	W. Ind.	Red Sea	Mediter.	E. Atl.	W. Atl.	Guadalupe	Clarion
Chlorogloea regularis	+	.	.	.	.	.	.	.	+	.
Chamæsiphon clavatus	.	.	.	.	.	.	.	.	+	.
Spirulina labyrinthiformis	.	.	.	.	.	.	+	.	+	.
Phormidium fragile	+	.	.	+	.	+	+	+	.	+
Phormidium monile	.	.	.	.	.	.	.	.	+	.
Lyngbya majuscula	+	+	+	+	+	+	+	+	+	.
Lyngbya epiphytica	+	+	.	.	.	.	.	.	+	.
Lyngbya confervoides	+	+	.	.	+	+	+	+	+	.
Lyngbya æstuarii	+	.	+	.	.	+	+	.	+	.
Lyngbya lutea	.	.	.	.	.	+	+	+	+	.
Lyngbya erecta	.	.	.	.	.	.	.	.	.	+
Symploca microdonta	.	.	.	.	.	.	.	.	+	.
Hydrocoleum lyngbyaceum	+	.	+	.	.	+	+	+	+	.
Hydrocoleum cantharidosmum	.	+	+	+	.	.	+	+	+	.
Hormothamnion enteromorphoides	.	+	+	+	.	.	.	+	+	.
Calothrix codicola	.	.	.	.	.	.	.	.	+	.
Calothrix crustacea	+	+	+	+	.	+	+	+	+	.
Calothrix confervicola	.	+	.	+	+	+	+	+	+	.
Calothrix clausa	.	.	.	.	.	.	.	.	+	.
Calothrix æruginea abbreviata	.	.	.	.	.	.	.	.	+	.
Microchæte viticnsis	.	+	.	.	.	.	.	.	+	.
Brachytrichia Codii	+	.	.	.	.	.	.	.	+	.
Caulerpa racemosa	+	+	+	+	+	.	.	+	+	.
Chlorodesmis comosa	.	+	+	+	.	.	.	.	+	+
Codium fragile	+	+	.	.	.	.	+	.	+	.
Codium decorticatum	+	.	.	.	.	.	+	.	.	+
Codium simulans	+	.	.	.	.	.	.	.	+	.
Codium latum	+	+	.	.	.	.	.	.	+	.
Halimeda Opuntia	.	+	+	+	+	.	+	+	+	.
Dictyosphaeria Versluysi	+	+	+	.	.	.	.	.	+	.
Siphonocladus pusilloides	.	.	.	.	.	.	.	.	+	.
Acetabularia parvula	.	.	+	.	.	.	.	.	.	+
Chætomorpha antennina	+	.	.	+	.	.	.	.	+	.
Microdictyon Palmeri	.	.	.	.	.	.	.	.	+	.
Enteromorpha plumosa	+	.	+	.	.	+	+	+	.	+
Enteromorpha lingulata	+	+	+	.	.	+	+	+	+	.
Ulva angusta	+	.	.	.	.	.	.	.	+	.
Ulva Lactuca	+	+	+	+	+	+	+	+	.	+
Ulvella Lens	+	.	.	.	.	+	+	.	+	.
Ostreobium Reineckei	.	+	.	.	.	.	.	.	+	+
Sphacelaria furcigera	+	+	+	+	+	+	+	+	+	.
	22	18	15	12	7	13	18	15	35	8

	E. Pac.	W. Pac.	E. Ind.	W. Ind.	Red Sea	Mediter.	E. Atl.	W. Atl.	Guadalupe	Clarion
Sphacelaria novæ-hollandiæ	+	.	+	.	.	.	.	+	+	.
Sphacelaria Masonii	.	.	.	.	.	.	.	.	.	+
Ectocarpus breviarticulatus	+	.	.	.	.	.	.	+	+	.
Ectocarpus Mitchellæ	+	.	.	.	.	.	.	+	+	.
Ectocarpus Duchassaingianus	.	+	+	.	.	.	.	+	+	.
Streblonema codicola	.	.	.	.	.	.	.	.	+	.
Masonophycus paradoxa	.	.	.	.	.	.	.	.	.	+
Halothrix lumbricalis	.	.	.	.	.	.	+	+	+	.
Colpomenia sinuosa	+	+	+	+	+	+	+	+	.	+
Chnoospora pannosa	+	.	.	.	.	.	.	.	+	.
Desmarestia pacifica	+	.	.	.	.	.	.	.	+	.
Desmarestia herbacea	+	.	.	.	.	.	+	.	+	.
Sporochnus pedunculatus	.	.	.	.	.	.	+	+	+	.
Eisenia Masonii	.	.	.	.	.	.	.	.	+	.
Eisenia desmarestioides	.	.	.	.	.	.	.	.	+	.
Aglaozonia canariensis	.	.	.	.	.	.	+	+	.	+
Dictyota cribrosa	.	.	.	.	.	.	.	.	+	.
Dictyota Masonii	.	.	.	.	.	.	.	.	+	.
Neurocarpus delicatulus	.	.	+	.	.	.	.	+	.	+
Zonaria Farlowii	+	.	.	.	.	.	.	.	+	.
Blossevillea Brandegeei	.	.	.	.	.	.	.	.	+	.
Sargassum Palmeri	+	.	.	.	.	.	.	.	+	.
Sargassum paniculatum	.	.	+	.	.	.	.	.	+	.
Goniotrichum Alsidii	+	+	+	.	.	+	+	+	+	.
Gelidium microphysa	.	.	.	.	.	.	.	.	+	.
Ahnfeldtia gigartinoidea	+	.	.	.	.	.	.	.	.	+
Mychodea episcopalis	+	.	.	.	.	.	.	.	+	.
Gracilaria crispata	+	.	.	.	.	.	.	.	.	+
Champia parvula	.	+	+	.	.	.	+	+	.	+
Hooperia Baileyana	.	.	+	.	.	.	.	+	+	.
Hypnea Evermannii	.	.	.	.	.	.	.	.	+	.
Asparagopsis Sanfordiana	+	+	.	.	.	.	.	.	.	+
Richardia Montagnei var.	+	.	.	.	.	.	.	.	+	.
Laurencia Masonii	.	.	.	.	.	.	.	.	+	.
Laurencia humilis	.	.	.	.	.	.	.	.	+	.
Laurencia papillosa pacifica	+	.	.	.	.	.	.	.	+	.
Chondria clarionensis	.	.	.	.	.	.	.	.	.	+
Polysiphonia tongatensis	.	+	.	.	.	.	.	.	+	.
Polysiphonia Masonii	.	.	.	.	.	.	.	.	.	+
Polysiphonia Eastwoodæ	.	.	.	.	.	.	.	.	+	.
Polysiphonia homoia	.	.	.	.	.	.	.	.	+	.
	16	6	8	1	1	2	7	12	30	11

	E. Pac.	W. Pac.	E. Ind.	W. Ind.	Red Sea	Mediter.	E. Atl.	W. Alt.	Guadalupe	Clarion
Polysiphonia guadalupensis	..	..	..	..	..	..	..	..	+	..
Falkenbergia Hillebrandtii	..	..	..	..	..	..	..	+	+	..
Herposiphonia tenella	..	..	+	..	..	+	+	+	..	+
Herposiphonia rigida laxa	+?	..	..	..	..	..	..	..	+	..
Janczewskia Solmsii	+	..	..	..	..	..	..	..	+	..
Heterosiphonia subsecundata	+	..	..	..	..	..	..	..	+	..
Dasya Stanfordiana	+	..	..	..	..	..	..	..	+	..
Dasya Eastwoodæ	..	..	..	..	..	..	..	..	+	..
Calacodasya sinicola	+	..	..	..	..	..	..	..	..	+
Rhodochorton Daviesii	+	..	..	..	..	..	+	+	+	..
Rhodochorton Eastwoodæ	..	..	..	..	..	..	..	..	..	+
Spyridia filamentosa	+	..	+	+	+	+	+	+	+	..
Crouania attenuata	..	..	..	..	..	+	+	+	+	..
Callithamnion byssoides	..	..	..	..	..	..	+	+	+	..
Gymnothamnion elegans	..	..	..	..	..	..	+	+	..	+
Pleonosporium sacchoriza	..	..	..	..	..	..	..	..	+	..
Ceramium Evermannii	..	..	..	..	..	..	..	+	+	..
Ceramium transversale	..	..	..	..	..	..	..	+	+	..
Ceramium clarionensis	..	..	..	..	..	..	..	..	..	+
Ceramium personatum	..	..	..	..	..	..	..	..	+	..
Ceramium affine	..	..	..	..	..	..	..	..	+	..
Ceramium ornatum	..	..	..	..	..	..	..	..	+	..
Clarionea Masonii	..	..	..	..	..	..	..	..	..	+
Peyssonellia rubra	..	+	+	..	..	..	+	+	+	+
Choreonema Thureti	..	+	..	..	..	..	+	..	+	..
Fosliella paschalis	+	+	..	..	..	..	..	..	+	..
Litholepis accola	..	+	..	..	..	..	..	..	..	+
Lithoporella pacifica	..	+	..	..	..	..	..	..	..	+
Lithothamnion validum	+	..	..	..	..	..	..	..	+	+
Amphiroa fragilissima	..	..	..	..	..	..	..	..	+	..
Corallina cubensis	..	..	..	..	..	..	..	+	+	..
Corallina subulata	..	..	..	..	..	..	..	+	+	..
Jania rubens	..	..	+	..	..	+	+	+	+	..
Jania adhaerens	..	..	..	..	..	..	..	+	+	..
	9	5	4	1	1	4	9	14	26	10
TOTAL	47	29	27	14	9	19	34	41	91	29

MYXOPHYCEÆ

Family Chroococcaceæ

CHLOROGLŒA Wille, Algol. Not., I-VI, 1900, p. 5

1. **Chloroglœa regularis** S. and G.

Epiphytic on various species of both calcareous and non-calcareous algæ. Mason, No. 188, Guadalupe Island.

Setchell and Gardner, Mar. Alg. Gulf Calif., 1924, p. 698.

The Guadalupe plants show decidedly larger colonies (600-800 μ diam.) than the type, but are to be distinguished from *Chlorogloea tuberculosa* (Hansg.) Wille by regularity of form and the distinct basal layer of radiating rows of cells with the peripheral cells elongated.

Family Chamæsiphonaceæ

CHAMÆSIPHON A. Braun et Grunow, *in* Rabenhorst, Fl. Eu. Alg., vol. 2, 1865, p. 148

2. **Chamæsiphon clavatus** sp. nov.

Plate 4, fig. 1

Cells subcylindrical to clavate, at times slightly curved, up to 60 μ long, 8-11 μ diam. at the apex, 4-6 μ at the base; wall smooth, hyaline; color bright blue-green; conidia mostly in a single series, occasionally double at the apex, spherical, 4.8-5.3 μ diam.

Growing singly or in loose clusters on various species of algæ, both calcareous and non-calcareous.

Type: No. 173619, Herb. Calif. Acad. Sci., collected by H. L. Mason (No. 63), in April, at **Guadalupe Island.**

A species probably closely related to *Chamæsiphon curvatus* Nordst., but is usually straight and has the apex obtuse and at times slightly swollen instead of attenuated.

Family OSCILLATORIACEÆ

SPIRULINA TURP. (EMEND. GARDNER) TURPIN, *in* Dict. des Sci. Nat. de Levrault, vol. 50, 1827, p. 309; Gardner, New Pac. Coast Mar. Alg. I, 1917, p. 379

3. **Spirulina labyrinthiformis** (Menegh.) Gom.

Very sparsely scattered among other minute algæ.

Mason, No. 142. Guadalupe Island.

Gomont, Monogr. 1892, p. 255. *Oscillaria labyrinthiformis* Meneghini, Consp. Alg. Eug., 1837, p. 9.

Filaments of a *Spirulina* occur occasionally and are scattered in the material from Guadalupe Island, never in mass. The dimensions lead us to refer them tentatively to this species because of the regularity, closeness of turns, and diameter of the spiral. The question may be raised as to possible relationship to *S. subsalsa* f. *oceanica* Gom.

PHORMIDIUM KUETZ., Phyc. Gen., 1843, p. 190

4. **Phormidium fragile** (Menegh.) Gom.

Intermixed with various other species of Myxophyceæ.

Mason, No. 70. Clarion Island.

Gomont, Monogr., 1892, p. 163, pl. 4, figs. 13-15. *Anabæna fragilis* Meneghini, Consp. Alg., 1837, p. 8.

Our specimens resemble No. 1609a, Phyc. Bor. Amer., supposedly from San Francisco Bay, California, except in showing slightly more slender (1-1.5 μ diam.) filaments than the average.

5. **Phormidium monile** sp. nov.

Plate 4, fig. 2

Filaments relatively very long, straight or flexuous, 7-8 μ diam.; trichomes 3.5-4 μ diam.; cells quadrate, deeply constricted at the cross-walls, pale æruginous; terminal cell blunt, rounded, sometimes even considerably enlarged; sheath conspicuous, hyaline, smooth, distinct, not diffluent.

Intermixed with various other Myxophyceæ.

Type: No. 173633, Herb. Calif. Acad. Sci., collected by H. L. Mason (No. 95), in April, at **Guadalupe Island.**

When scattered filaments are encountered, the impression is given of a *Lyngbya,* but, at times, small layers are seen, when the long, parallel, and closely placed filaments show the *Phormidium* character. The distinctness of the sheaths separate this clearly from *Ph. hormoides* S. and G., of the central Californian coast.

LYNGBYA Agardh, Syst. Alg., 1824, p. XXV

6. **Lyngbya majuscula** Harv.

Interspersed among other species of Myxophyceæ growing on *Chnoospora.* Mason, No. 60. Guadalupe Island.

Harvey, *in* Hooker, Engl. Fl., vol. 5, part 1, 1833, p. 370.

The Guadalupe plant seems typical of the species, which was collected on the west coast of Mexico by Liebman and described as *Lyngbya crassa* by J. G. Agardh in 1847 (Nya Alger från Mexico, p. 6). It is of general occurrence in the warmer portions of the Pacific as well as of the Atlantic Ocean.

7. **Lyngbya epiphytica** Hieron.

Epiphytic principally upon species of *Calothrix.* Mason, No. 117a, Guadalupe Island.

Hieronymus, *in* Kirchner, Schiz., *in* Engler and Prantl, Naturl. Pflanzenfam., 1898, p. 67.

The very slender spiral filaments of this species are often found entwining filaments of marine algæ such as *Calothrix, Lyngbya,* etc. It has been reported from Tahiti and from the coast of central California as to the Pacific localities.

8. **Lyngbya confervoides** Ag.

In company with other species of Myxophyceæ and growing on rocks. Mason, No. 43b. Guadalupe Island.

Agardh, Syst. Alg., 1824, p. 73.

This widespread species is known from the coast of central California and from various other localities in the Pacific Ocean, as well as in the East Indian region of the Indian Ocean.

9. **Lyngbya æstuarii** (Mert.) Liebm.

Among other Myxophyceæ. Mason, No. 102, Guadalupe Island.

Liebman, Bemerk., *in* Kröyers Tidskr., 1841, p. 492.

Conferva æstuarii Mertens, *in* Jürg., Alg. aquat. Dec. II n. 8, 1816.

The filaments are from 24 μ to 28 μ in diameter, the sheaths mostly light to distinctly yellow in color, and the trichome 20 μ in diameter. No well developed calyptrate terminal cells were seen, but indications of their presence seemed conclusive.

10. **Lyngbya gracilis** (Menegh.) Rab.

Associated with other species of algæ. Mason, No. 65. Guadalupe Island.

Rabenhorst, Fl. Eu. Alg., vol. 2, 1865, p. 145.

Leibleinia gracilis Meneghini, *in* Gior. Bot. Ital., vol. 1, 1844, p. 304.

We have referred our specimens to this species with some hesitation, relying largely upon the cells being from about one-half as long as broad up to quadrate to distinguish them from *L. Meneghiniana* (Kuetz.) Gomont and from *L. Agardhii* (Crouan) Gomont, since our alcoholic specimens have lost their original color. *Lyngbya gracilis* has been distributed (Phyc. Bor. Amer., No. 853) from the coasts of southern California.

11. **Lyngbya lutea** (Ag.) Gom.

Intermingled with other algæ. Mason, No. 157. Guadalupe Island.

Gomont, Essai, *in* Journ. de Bot., vol. 4, 1890, p. 354.

Oscillatoria lutea Agardh, Syst. Alg., 1824, p. 68.

A few filaments were noted, seemingly of this species. They were flexible, straight or twisted, with thin sheaths and with trichomes about 4 μ in diameter. The dissepiments were largely obscured, but the cells seemed to be nearly quadrate or somewhat shorter than long. The terminal cell was rounded and calyptrate. In tropical waters it occurs also in the West Indian region. The sheath is thin and so hyaline as to require care in demonstrating its presence.

12. **Lyngbya erecta** sp. nov.

Filaments 1-2 mm. long, attached by a single basal cell and standing perpendicular to the host, forming dense tufts, straight and smooth or slightly flexuous, 2.6-3 μ diam.; trichomes 1.3-1.6 μ diam., slightly constricted at the cross walls, sheath distinct, hyaline, smooth; cells quadrate to very slightly longer or shorter; terminal cell rounded, blunt, non-calyptrate.

Epiphytic on *Ahnfeldtia gigartinoides*.

Type: No. 173634, Herb. Calif. Acad. Sci., collected by H. L. Mason (No. 163), in June, at **Clarion Island.**

This seemingly very distinct species is found clothing the filaments of the *Ahnfeldtia*, attached at the base and extending out perpendicularly. The very slender filaments have delicate hyaline, but distinct sheaths and are straight below, but flexuous and somewhat entangled above. The color has been lost in the alcoholic material. The habit is reminiscent of that of the freshwater *L. versicolor* Gomont, but our species is clearly marine, much more slender, with more delicate sheath, and different in details of trichome structure.

SYMPLOCA Kuetzing, Phyc. Gen., 1843, p. 201

13. **Symploca microdonta** sp. nov.

Plate 4, fig. 3

Fascicles up to 1 mm. high, inconspicuous, or plants at times forming a very thin stratum without definite erect fascicles; filaments very tortuous, intricately intertwined, 7.5-8.5 μ diam., with sparse branching, at times two branches emerging at the same level; trichomes 6.5-7 μ diam., with quadrate cells constricted at the cross walls; terminal cell blunt, end wall not thickened; sheath firm, thin, hyaline, smooth.

Growing among other Myxophyceæ.

Type: No. 173616, Herb. Calif. Acad. Sci., collected by H. L. Mason (No. 78), in April, at **Guadalupe Island.**

Scattered among the material from Guadalupe Island, we found in several preparations, an alga of obscure but seemingly undoubted symplocoid habit. The tufted fascicles, however, were not over 1 mm. high and, in some cases, absent.

The specimens having been preserved in alcohol, the color was lost. In trichome structure our species approaches *S. hydnoides* Kuetz., but in habit shows nothing of the erect and comparatively very high fascicles of that species.

HYDROCOLEUM Kuetzing, Phyc. Gen., 1843, p. 196

14. **Hydrocoleum cantharidosmum** (Mont.) Gom.

Intermixed with various other Myxophyceæ growing on rocks. Mason, No. 104. Guadalupe Island.

Gomont, Essai, 1890, p. 353. *Lyngbya cantharidosma* Montagne, *in* Webb and Berthelot, Hist. Canar., vol. 3, part 3, 1840, p. 188.

The *Hydrocoleum* habit is obscure in our specimens, but the stout trichomes (19-20 μ diam.), the cells about 4 μ high, and the suddenly rounded tip, distinctly capitate and calyptrate, seem to belong to this widespread species of warmer waters.

15. **Hydrocoleum lyngbyaceum** Kuetz

Associated with various other species of Myxophyceæ growing on rocks. Mason, No. 109. Guadalupe Island.

Kuetzing, Tab. Phyc., vol. 1, 1849, p. 37, pl. 51, fig. 1.

The specimens placed under this species are phormidioid in habit, with trichomes 9-10 μ in diameter, having cells 2-3 μ high, and a gradually attenuated tip which is both capitate and calyptrate. They seem clearly to belong to this widespread species.

Family Nostochaceæ

HORMOTHAMNION Grunow, Reise der Novara, Algen, 1867, p. 31, pl. 1, fig. 2

16. **Hormothamnion enteromorphoides f. gracilis,** f. nov.

Filaments parallel, agglutinated into strands; sheaths thin, hyaline, often confluent; trichomes 4.5-5.5 μ diam., apex slightly attenuated; cells broadly dolioform to compressed-spherical, apical cell blunt-conical; heterocysts the same shape as the cells, slightly larger.

In strand-like, gelatinous masses intermingled with other algæ. Mason, Nos. 61a, 62, 105, 113a, 117, and 138. Guadalupe Island.

Type: No. 173643, Herb. Calif. Acad. Sci., collected by H. L. Mason (No. 117), in April, at **Guadalupe Island.**

A species seeming to belong to this genus occurred in frequent admixture in the Guadalupe collections. It was persistently sterile, but its short, compressed cells, its more or less compressed heterocysts, its distinct gelatinous sheath, seemed to separate it from *Anabæna,* and the strikingly parallel arrangement of the trichomes seems to point towards *Hormothamnion.* Its trichomes 4.5-5.5 μ in diameter and attenuate at both ends seem to indicate possible closeness to *H. enteromorphoides* Grunow, but it is somewhat more slender than the plant described by Grunow (Alg. Novara) from Tongatabu. The parallel arrangement of the trichomes much like those of a *Phormidium* is definite, but the gross habit and original color could not clearly be determined from the admixtures of algæ preserved in alcohol. It has shorter cells than those described for *H. convolutum* Collins and Hervey (1917, p. 24), and while we refer it provisionally as a slender form to *H. enteromorphoides* we also feel that it may prove to be a distinct species.

Family Rivulariaceæ

CALOTHRIX Agardh, Syst. Alg., 1824, p. XXIV

17. **Calothrix codicola** sp. nov.

Plate 4, fig. 4

Filaments 14-16 μ diam. at the slightly enlarged base, almost cylindrical to the short-tapering apex, 400-600 μ long; trichomes 10-12 μ diam. at the base, tapering very gradually toward apices terminating in a short hair when young, in the lower parts slightly constricted at the cross walls; cells bright blue-green, quadrate to slightly longer or shorter, contents homogeneous; heterocysts basal and intercalary, 1-3 at the base, when single slightly narrower than the trichome and subspherical, when more than one, the others in the series 1.5-3 times as long as the diameter; sheath close fitting throughout, thin, smooth, homogeneous, hyaline.

Growing among the utricles of *Codium fragile* (Suringar) Hariot, in company with *Brachytrichia codii* Setchell.

Type: No. 173636, Herb. Calif. Acad. Sci., collected by H. L. Mason (No. 39), in April, at **Guadalupe Island.**

Codium species seem to be favorable hosts for various minute members of Myxophyceæ, as well as of other groups of marine algæ. It is to be questioned as to whether the peculiarities of the *Codium* exercise such an influence on these various epiphytes (or endophytes) as to modify their structure and particularly their habit, from what they might assume upon hosts of other consistencies, owing to possibly peculiar ease of penetration. The *Calothrix* described above seems to differ so much from any of the epiphytic species described and to come so much closer, perhaps, to some of the rupicolous species, that we hesitate to assign it definitely. It differs from both *C. æruginea* Thuret and *C. parasitica* Thuret, in diameter of filament and trichome sufficiently to be regarded as distinct, and it differs also in cell proportions from both of the cited species. It is not bulbous at the base as is *C. parasitica.* Our plants seem to branch, but possibly the branches may represent epiphytic plants of hormogonial origin, at least the branches resemble the similar structures of *C. crustacea* Thuret (cf. Notes Algol., Fasc. 1, pl. IV). The cell proportions in our specimens differ from those of *C. crustacea.*

18. **Calothrix crustacea** Thur.

Growing on rocks in company with other Myxophyceæ. Mason, Nos. 42, 107, 115. Guadalupe Island.

Thuret, *in* Bornet and Thuret, Notes Algol., fascicle 1, 1876, pp. 13-16, pl. 4.

Calothrix crustacea Thuret is a variable species, usually characterized by its size, intercalary as well as basal heterocysts, and its distinct hyaline sheath, occasionally yellow below. Typically it forms an æruginous layer on rocks, but often occurs also epiphytic on broader or more slender algæ. It is unbranched, but very commonly is infested more or less with epiphytic filaments of the same species which have arisen from the usually abundant hormogonia (cf. Bornet et Thuret, Notes Algologiques, pl. 4). This gives such plants the superficial appearance of being branched. Our specimens seem to agree

in all details with typical *C. crustacea* Thuret, but exceed the published measurements as to diameter of trichome (10-20 μ).

19. **Calothrix confervicola** (Roth.) Ag.

Growing on *Laurencia*. Mason, No. 46. Guadalupe Island.

Agardh, Syst., Alg., 1824, p. 70. *Conferva confervicola* Roth, Cat. Bot., fascicle 3, 1806, p. 193.

This occurs in stellate clusters on the host and seems typical, although the natural color has been changed by being preserved in alcohol. The sheaths are homogeneous and hyaline, thus distinguishing it from *C. consociata* Born. and Thur.

20. **Calothrix clausa** sp. nov.

Plate 4, fig. 5

Filaments 30-34 μ diam., 500-600 μ up to 1 mm. long, tortuous; trichomes 24-28 μ diam., cylindrical except at the short, tapering apices, ending in a short, narrow hair, constricted prominently at the cross walls, bright blue-green; cells 3-4 μ long, with homogeneous contents uniform throughout the filament; heterocysts basal and intercalary, solitary, same diameter as the trichome, hemispherical to elongated-cylindrical; sheath hyaline, homogeneous, smooth, close fitting, for the most part closed at the apices.

Growing in association with other Myxophyceæ on rock.

Type: No. 173629, Herb. Calif. Acad. Sci., collected by H. L. Mason (No. 59), in April, at **Guadalupe Island.**

The species, proposed as new, is a member of the *Calothrix confervicola* group, with trichomes thicker than any of its other members, and showing, at least so far as the type specimen is concerned, a sheath normally contracted even to cloture at the apex. It seems desirable to describe it as new.

21. **Calothrix æruginea var. abbreviata** var. nov.

Filaments 9-11 μ diam. at the base, 130-150 μ long, decumbent for considerable distance at the base or in the middle and turning upward at both ends; trichomes 7-8 μ diameter at the

base, not bulbose, tapering gradually from the base to the apex, ending in a short, slender hair; cells quadrate or shorter, very slightly constricted at the cross walls; heterocysts basal, hemispherical, of the same diameter as the trichomes, single, or rarely two, at the base; sheath very thin, smooth, homogeneous, hyaline, not ocreate.

Growing on *Ectocarpus Duchassaingianus*.

Type: No. 173617, Herb. Calif. Acad. Sci., collected by H. L. Mason (No. 113), in April, at **Guadalupe Island.**

22. **Calothrix** sp.

A single tuft of a very slender *Calothrix* seems nearest to the plant described under *C. epiphytica* W. and G. S. West (in S. and G., Mar. Alg. Pacific Coast N. A.) or Gardner's *C. linearis* from Porto Rico. The trichomes show bulbous enlargements at the base and are very slender. They measure 4-5 μ diam. at the base, 2.5-3 μ above, and 175-225 μ long. Mason, No. 33a. Clarion Island.

DICHOTHRIX ZANARDINI, Plant Mar. Rubri Enumer., 1858, p. 89

23. **Dichothrix** sp.

Growing among other minute algæ on rocks. Mason, No. 149. Guadalupe Island.

A few fragments of a very slender species, seemingly of *Dichothrix* have been noted in one of our preparations. The trichomes are slender (6-8 μ diam), somewhat swollen at the base, with heterocysts exceeding the diameter of the trichomes and with hyaline, gelatinous sheaths. The material is insufficient for description of a new species and it does not seem to agree with any that are described. It is noted for the information of future explorers.

SCYTONEMATACEÆ

MICROCHÆTE THURET, Essai, 1875, p. 7

24. **Microchæte vitiensis** Askenasy

Associated with other species of Myxophyceæ. Very sparse. Mason, No. 137. Guadalupe Island.

Askenasy, *in* Bornet and Flahault, Tab. Syn. Nostochacées, 1885, p. 22.

A minute alga, clothing other slender, filamentous algæ, looking like a small *Calothrix,* with curved base, but the apex of trichome blunt and not at all attenuate. It has been detected on the coasts of Fiji (type), Samoa, and Tahiti. In the Guadalupe specimens, the cells are shorter than in the type.

STIGONEMATACEÆ

BRACHYTRICHIA ZANARDINI, Phyc. Ind. Pug., 1872, p. 24

25. **Brachytrichia Codii** Setchell

Among the utricles of *Codium fragile.* Mason, No. 143, Guadalupe Island. Setchell, Tahitian Alg., 1926, p. 66.

This pholadophyte (or snuggling) species of *Brachytrichia,* described from Tahiti, but also noted from Hawaii, may now be reported from Guadalupe Island.

CHLOROPHYCEÆ

Family CAULERPACEÆ

CAULERPA LAMOUROUX, Mém. sur la Caulerpes, 1809, p. 141

26. **Caulerpa racemosa var. clavifera f. macrophysa** (Kuetz.) Weber-van Bosse

Mason, No. 58. Guadalupe Island.

Weber-van Bosse, Monogr. des Caulerpes, 1898, p. 361, pl. 33, fig. 4. *Chauvinia macrophysa* Kuetzing, Tab. Phyc., vol. 7, 1857, p. 6, pl. 15, fig. 2.

The plants collected were close to this form except that the swollen ramuli were only slightly over 2 mm. in diameter. Our plants therefore incline towards f. *microphysa* W.-v. B. The type is from Central America.

27. **Caulerpa racemosa lætevirens f. cylindracea** (Sond.) Weber-van Bosse

Mason, No. 98. Guadalupe Island.

Weber-van Bosse *(loc. cit.),* p. 366. *Caulerpa cylindracea* Sonders, Alg. Preiss, Botan. Zeit., 1845, p. 49.

These were robust plants, whose branches were well clothed with cylindrical ramelli, blunt, but barely swollen at the summit. The type is from western Australia.

28. **Caulerpa racemosa var. lætevirens f. typica** Weber-van Bosse

Mason, No. 122. Guadalupe Island.

Weber-van Bosse *(loc. cit.)*.

Our plants are robust specimens with fairly closely placed, well inflated ramelli, on long tapering pedicels. The type is from Toud Island, north of Australia.

Family Codiaceæ

CHLORODESMIS Harvey and Bailey, Proc. Boston Soc. Nat. Hist., vol. 3, 1851, p. 373

29. **Chlorodesmis comosa** Bailey and Harvey

Mason, No. 97, Guadalupe Island, and No. 17, Clarion Island. There was only a single young example in the collection from the lattter locality.

Bailey and Harvey *(loc. cit.)*.

The Clarion Island plant was a young example and typical, but the Guadalupe plant seems to represent only a scrappy basal portion. The latter is referred to this species without absolute certainty since the upper portions with typical dichotomies are lacking. The type came from Fiji but the plant is abundant in the tropical Pacific, growing usually as a cumatophyte, or surge plant.

CODIUM Stackhouse, Nereis Brit., Fasc. 2, 1797, p. XVI

30. **Codium fragile** (Suring.) Hariot

Growing on rocks. Mason, No. 7, Guadalupe Island.

Hariot, Algues du Cap Horn, 1889, p. 32. *Acanthocodium fragile* Suringar, Alg. Japon., Index, 1867.

No. 7 represents a slender form (or state) of this widespread species. We did not detect it in the Gulf of California specimens collected by the California Academy Expedition of 1921 (cf. Proc. Calif. Acad. Sci., 4 ser., vol. 12, No. 29,

1924). It is of decided interest therefore to find it among the subtropical Guadalupe collections, and not among the tropical collections of the Gulf of California and of Clarion Island. The temperature control of this species as well as of the relations between Guadalupe Island, the ocean coasts of the mainland, and the coasts of the Gulf of California are not at all clear.

31. **Codium decorticatum** (Woodw.) Howe?

Mason, No. 16, Clarion Island.

Howe, Phyc. Studies, V, 1911, p. 494. *Ulva decorticata* Woodward, Trans. Linn. Soc., vol. 3, 1797, p. 55?

We refer to this species specimens similar to those we referred under it in our Marine Algæ of the Pacific Coast of North America (Part II, 1920, pp. 172-175) and with the same mental reservations. The original plant of Woodward is described as being destitute of a base, terete, branched toward the base, six feet and over in length, and four lines in breadth. The branches were long, once but not over twice branched and compressed at the base of the dichotomies, the apices being attenuate-obtuse. The base of the specimen, being expanded, was probably at or very near the attachment. Near the base it was branched into three or more parts, one of which was very short, two were dichotomously branched about six inches above their origin, continuing simple to their tips, and the fourth or longest, after being divided once near the base, continues simple for three feet, then divides dichotomously, the branches continuing simple to the end. The type presumably came from some one of the Mediterranean coasts, but the exact locality is not definitely known. No type specimen is known, so that the characteristics of the utricle remain in doubt. C. A. Agardh (Spec. Alg., 1822, p. 454) presumed that the *Ulva decorticata* of Woodward was the same as his *Codium elongatum,* described as compressed, with the type locality at Cadiz. Montagne (Fl. Alger., vol. 1, 1846, p. 49, pl. 13, fig. 1) also describes it as compressed. Of later described species, two have a nearer approach to the habit of that of *Ulva decorticata* Woodw. than to the *Codium elongatum* Ag. One is *Codium Chazaliei* Weber-van Bosse (Journ. de Bot., vol. 13, 1899, p. 134) from the Cape Verde Islands, over

a meter in length, cylindrical, rarely branched, with utricles 3 mm. long, 80 μ in diameter at the base, enlarging to 250 μ (even to 525 μ in portion of type material kindly sent by Dr. Anna Weber-van Bosse) at the summit, and with a number of sporangia spirally arranged on each. The other is *Codium longiramosum* of Setchell and Gardner (Proc. Calif. Acad. Sci., vol. 12, 1924, p. 710, pl. 15, f. 27, and pl. 37), from the Gulf of California, over a meter in length, cylindrical, branched chiefly at the base, with the utricles 1-1.8 mm. long, up to 1.2 mm. broad, and sporangia unknown. The latter species seems to be slightly dilated below the axils but no mention is made of this in the former. Bornet (Les Algues de P. K.-A. Schousboe, 1892, pp. 216, 217), has described the puzzling variations of the forms ascribed to *Codium elongatum* in Schousboe's collection, both as to habit and as to character of the utricles and subordinates the degree of infra axillary dilation to the relative size of the utricles, dividing them into (1) those with larger utricles and (2) those with smaller utricles. M. A. Howe, who places all the variants under *Codium decorticatum* (Woodw.) Howe (Phyc. Studies, V, 1911, pp. 494, 495), states that the utricles of Agardh's type specimen of *Codium elongatum* are from 110-225 μ in greatest diameter, while the La Paz plants he refers to his *C. decorticatum* have utricles up to 520 μ in greatest diameter, reach a length of decidedly over a meter, and are flattened now and then under the dichotomies.

Mason's No. 16, from Clarion Island, is a small plant, only 13-14 cm., branched somewhat above the base, with comparatively long branches for its length. It is cylindrical, but somewhat flattened and dilated under the axils. The utricles are 1-1.5 mm. long and up to 650 μ in greatest diameter, tapering from rounded apex to narrow base and thin-walled throughout. The hairs are situated in a circle just below the broad summit and are constricted at the point of connection, suddenly swollen above this and tapering off above as in *C. bulbopilum* Setchell. We are inclined to regard No. 16 as a young sterile plant. Hanna, in his journal of the voyage (Proc. Calif. Acad. Sci., Ser. 4, vol. 15, 1926, p. 37), in speaking of the dredging operations off Sulphur Bay on Clarion Island, says: "These pieces of apparatus brought up enormous quan-

tities of broken coral, coral sands, and seaweeds. The latter belong chiefly to one species which grows as long slender stalks, round in cross section and bright green in color. The sailors called it 'Spaghetti.'" Mr. Mason informs us that this was a *Codium* and that the material thus dredged in fair depth of water was wrapped with other coarse species, such as *Sargassums,* etc., in a piece of cheesecloth and placed in one of the kegs of alcohol with fish specimens. Unfortunately, this parcel has not been located among the collections of the trip. We suspect that these "Spaghetti" represent older and better developed states of No. 16, which we place under *Codium decorticatum* (Woodw.) Howe, with the suspicion that they may possibly be related rather to *C. longiramosum* S. and G. or to *C. amplivesiculatum* S. and G.

32. Codium latum Suringar?

Dr. A. Palmer, in 1875, collected a broad, flattened *Codium* on Guadalupe Island which we have referred (Mar. Alg. Pac. Coast N. A., Part 2, 1920, p. 175, pl. 15, f. 6) under the *Codium latum* of Suringar, being led thereto by the resemblance of our plant, both in habit and in utricle, to the illustration of that species by Okamura (Icones of Japanese Algæ, vol. 3, 1915, pl. 142, f. 4 and 6). These figures, however, are not entirely in accord with those of Suringar (Algæ Jap. Mus. Bot. Lugd. Bot., 1870, p. 22, pl. 7), especially as to the details of the structure of the utricle. An examination of utricles from the type specimen, for which privilege we are indebted to Dr. Anna Weber-van Bosse, shows the type agreeing with the figures of Suringar rather than with those of Okamura. Suringar does not figure any utricles with the peculiar hair structures shown by Okamura, but his specimen may have been young, or possibly also, he may have selected a specimen where they were not abundant. It may be, although this seems less probable, that there are two or more broad species in Japan. In fact Okamura (Icones of Japanese Algæ, vol. 3, 1915, pl. 136, figs. 1, 3, 4, and 7) has figured a broad plant under *Codium divaricatum* Holmes. This plant differs so much from the type as figured by Holmes, and as also figured by Okamura (loc. cit., fig. 2) as to lead one to suspect that they may be

specifically distinct. The broad specimen of Okamura (loc. cit., fig. 1) resembles in habit the *C. damæcorne* of Kuetzing (Tab. Phyc., vol. 6, 1856, pl. 98), but the utricles are different in shape. The utricles of Okamura's broad *C. divaricatum* resemble those of Suringar's type of *C. latum* in every way except that the apical membrane of Okamura's plant is decidedly thickened. The question as to whether there is more than one broad *Codium* of the general habit of *C. latum* in Japan is still to be decided.

The habit of the Guadalupe plant agrees in general with that of those figured by both Suringar and Okamura for *Codium latum* but has a greater number of dichotomies and has the lower dichotomies extended to the very bases. The basal branches are also very much more slender below than is represented for the Japanese plant. The utricles of the Guadalupe plant resemble fairly closely those given by Okamura but not so closely those given by Suringar and those examined from Suringar's type specimen. We feel inclined to separate the Guadalupe plant and dedicate it to its collector, but in view of the uncertainty as to the situation among the Japanese species, we retain our previous disposition of it, calling attention to the fact that there is very little in common between the Japanese algal flora of warmer waters and those of the similar waters of the west coast of North America.

33. **Codium simulans** S. and G.

Mason, No. 15, Clarion Island, and No. 41, Guadalupe Island (scrap).

Setchell and Gardner, Mar. Alg., 1924, p. 706, plate 14, figs. 21, 22, and plate 31.

Mason's No. 15 from Clarion Island agrees fairly well with the Gulf of California plants upon which we founded *Codium simulans,* except that the dimorphism of the utricles seems more pronounced and the larger (balloon-type) of utricle reaches a much greater diameter (up to 325 μ) and has the apical wall thin, while the larger utricle of the type is not so strongly set off from the narrower type (very similar in both type and Clarion Island plants) and has its apical wall slightly to decidedly thickened. The Guadalupe plant agrees closely

with the Clarion Island plant as to utricle characters. The Guadalupe plant is fertile.

HALIMEDA Lamouroux, Nouv. Bull. Sci. Soc. Philom., vol. 3, 1812, p. 186

34. **Halimeda Opuntia** (L.) Lamour.

Mason, No. 28, Guadalupe Island. Lamour., Hist. Polyp., 1816, p. 308. *Corallina Opuntia* Linnæus, Syst. Nat., 1758, p. 805, Sol., Nat. Hist. Zoophyt., 1786, p. 110, pl. 20, fig. 6.

The Guadalupe plants seem to belong to the typical form of this widely distributed tropical species.

Family Phyllosiphonaceæ

OSTREOBIUM Bornet and Flahault, Sur quelq. pl. viv, dans le teste calc. des. mollusques, 1889, p. 15

35. **Ostreobium Reineckei** Bornet

Abundant in shells and Melobesieæ. H. L. Mason, Nos. 209, Guadalupe Island, and 217, Clarion Island, etc.

Bornet, Engler's Jahrb., vol. 23, 1897, p. 269.

The specimens agree very well with the original description and with specimens from Samoa. Although searched for in our decalcifications, nothing pertaining with certainty as to the presence of other tranophytes was discovered.

Family Valoniaceæ

DICTYOSPHÆRIA Decaisne, Essais Class. Alg., 1842, p. 328

36. **Dictyosphæria Versluysi** Weber-van Bosse

Mason, No. 79, Guadalupe Island.

Weber-van Bosse, La Nuova Not., Ser. 16, 1905, p. 142.

Our specimens are solid, show segments up to 2 mm. in diameter, with frequent intracellular "cellulose" spines (or hairs) up to 320 μ in length. They agree with Weber-van Bosse's description, except that both segments and "hairs" have somewhat greater dimensions. The species occurs in the East Indies and in Hawaii.

SIPHONOCLADUS SCHMITZ, Ueber grüne Algen, 1878

37. **Siphonocladus pusilloides** sp. nov.

Plate 4, figs. 6 and 7

Fronds fasciculate, clavate, 7-10 mm. high, 400-500 μ diam. at the outer end, 90-125 μ diam. at the base; straight or slightly arcuate; wall very thick and lamellose, smooth, hyaline; rhizoids several times branched.

Type: No. 173644, Herb. Calif. Acad. Sci., collected by H. L. Mason (No. 110), in May, at **Guadalupe Island.**

The specimens under No. 110 are difficult to place and we, at first, assigned them provisionally under *Valonia,* since they resemble very closely the *V. pusilla* of Kuetzing's figures (Tab. Phyc., vol. 6, 1856, p. 30, pl. 86, b-e) from the Adriatic. Hauck refers this under *Siphonocladus* and it may be that our plant is a juvenile condition of some such species as *S. tropicus,* a species of the West Indian region (Lesser Antilles at least), Canary Islands, and the neighborhood of Honolulu. The very early stages of *Siphonocladus tropicus,* e.g., are claviform and simple (cf. Börgesen, Contr. a la conn. du genre *Siphonocladus* Schmitz, 1905, pp. 260, 261, fig. 1,a), and the early stages of *S. pusillus* are presumably represented by Kuetzing's figures already cited. In the uncertainty of relationships, it seems best to call attention to this interesting little plant and to assign it a name under the genus *Siphonocladus,* since its shape and an occasional partition seem to indicate its possible affinities.

Family DASYCLADACEÆ

ACETABULARIA LAMOUROUX, Polyp. Flex., 1816, p. 244

38. **Acetabularia parvula** Solms-Laubach

Mason, No. 174, Clarion Island.

Solms-Laubach, Monogr. Acetab., 1895, p. 29, pl. 2, figs. 3, 5.

A few specimens of a small *Acetabularia* were detected in the Clarion Island material. The stalk is stout, about 3-4 mm. long, and the disk about 3-4 mm. in diameter. The ray cells number from 14 to 18, are broadly wedge-shaped, gently

rounded on the outer end or with trace of apiculum, and slightly indented at the partitions. Coronal processes reach 52-65 μ in diameter, each with 3-4 hair scars. There are no aplanospores present. The calcification of the disks is strong only on the contact faces of the rays. This plant agrees fairly closely with the description and figures of Solms for his *Acetabularia parvula* from Macassar in the East Indies.

Family Cladophoraceæ

CHÆTOMORPHA Kuetzing, Phyc. Germ., 1845, p. 203

39. **Chætomorpha antennina** (Bory) Kuetz.

Growing on rocks. Mason, No. 20, Guadalupe Island.

Kuetzing, Sp. Alg., 1849, p. 379. *Conferva antennina* Bory, Quatre Îles d'Afr., vol. 2, 1804, p. 161.

It is difficult to be certain of the habit of this form of *Chætomorpha,* but it is certainly entangled above, though it appears to be erect below. While we have found filaments tapering to a small fraction of the ordinary diameter above, we have not been able to detect a strictly basal cell. The lowest cell found was 75 μ in diameter and 500 μ long, while the upper cells are 500-550 μ in diameter and up to 2 or even 3 times as long as broad. It may be a form of *Ch. antennina* of our Pacific Coast of North America and probably widespread in the Pacific Ocean. It approaches also M. A. Howe's *Ch. cartilaginea* from the Chincha Islands in some of its characters. Until the base is known, the exact determination must remain in doubt. Such characters as are determinable in our specimens indicate possible intermediate position between Bory's species and that of Howe.

MICRODICTYON Decasne, Pl. de l'Arab. *in* Arch. du Mus. II, 1841, p. 115

40. **Microdictyon Palmeri** Setchell.

Guadalupe Island. Setchell. Univ. Calif. Pub., Bot., vol. 13, p. 106, 1925.

We have seen a single specimen in Herb. Farlow, collected by Dr. E. Palmer in 1875. It belongs to the *Virescentes* section of the *Calodictyon* group and has elongated cells in the primary filaments.

Family ULVACEÆ

ENTEROMORPHA LINK, Epistola, 1820, p. 5

41. **Enteromorpha plumosa** Kuetz.

Growing on rocks among other algæ. Mason, No. 31, Clarion Island. Kuetzing, Phyc. Gen., 1843, p. 300, pl. 20, fig. 1.

The plants referred here from Clarion Island are in agreement with our idea of this species as expressed in part II of our Marine Algæ of the Pacific Coast of North America (1920, p. 259).

42. **Enteromorpha lingulata** J. Ag.

Mason, No. 81, Guadalupe Island. J. G. Agardh, Till. Alg. Syst., 1885, VI.

It seems best to refer to this species, specimens which occur having much the habit of *Enteromorpha compressa,* but with the cells more regularly arranged in vertical rows than is customary in that species.

ULVA LINNÆUS, Gen. Plant, 1737, p. 326

43. **Ulva angusta** S. and G. var.?

A single narrow frond. Mason, No. 45. Guadalupe Island.

The absence of a base makes the reference of this *Ulva* uncertain, but its cell structure recalls that of *U. angusta* rather than that of *U. Linza.* The cells are rounded quadrate to polygonal in surface view, sections through the fronds are 60 μ and more thick, and the cells 25-30 μ in every diameter, the cells being practically square in cross section. It may possibly be a form of *U. Lactuca* but it differs decidedly in habit as well as in thickness from that species. It may be only a robust form of our *U. angusta* known hitherto only from central California.

44. **Ulva rigida** Ag.

Cast ashore? Mason, No. 99, Maria Madre Island. Agardh, Sp. Alg., vol. 1, part 2, 1822, p. 410.

The fronds are broader than long and without finger-like lobes. The fronds are 80-85 μ thick, with the cells of each layer higher than broad.

45. **Ulva Lactuca** L.

Mason, No. 120, Clarion Island. Linnæus, Sp. Plant., vol. 2, 1753, p. 1163.

The membranes of our plants are somewhat perforated, but otherwise they resemble closely the *Ulva Lactuca* of Vickers's Algæ Barbadenses (Plate 1), which is *Ulva Lactuca* in the sense of Thuret and a widespread tropical type.

Family Chætophoraceæ

ULVELLA Crouan, Notes sur quelq. nouv. algues mar., 1859, p. 288, pl. 22, fig. E

46. **Ulvella Lens** Crouan

Growing on various species of algæ. Mason, Nos. 180, 181, Guadalupe Island.

Crouan *(loc. cit.)*.

This seems close to the plant we have credited to the California coast in our Marine Algæ of the Pacific Coast of North America (part II, 1920, p. 295, pl. 33). The central cells are empty, having presumably discharged their zoospores.

MELANOPHYCEÆ

Family Sphacelariaceæ

SPHACELARIA Lyngbye, Hydrophyt. Dan., 1819, p. 103

47. **Sphacelaria furcigera** Kuetz.

Growing on *Sargassum Palmeri.* Mason, No. 90. South Anchorage, Guadalupe Island.

Kuetzing, Tab. Phyc., vol. 5, 1855, p. 27, pl. 90, fig. II.

The base is more or less endophytic, penetrating the host. The main filament is 45 μ in diameter and the propagula are slender and bifurcate.

48. **Sphacelaria novæ-hollandiæ** Sonder

Growing on rocks among various species of algæ. Mason, No. 114. Guadalupe Island. Sonder, *in* Botan. Zeit., 1845, p. 50.

The basal filaments are creeping. The erect filaments are simple below, sparingly branched, 40-50 μ in diameter, with the joints about quadrate in surface view. The propagula have lateral cells above, divided into two, blunt. This is a more slender epiphytic form, with less branching above and with the joints shorter proportional to their length than is the case in *S. novæ-caledoniæ* Sauv. It is credited to Australia, Mangareva, Vavau, in the Tonga Islands, and the Antilles.

49. **Sphacelaria Masonii** sp. nov.

Plate 5, fig. 9

Fronds composed of a relatively extensive, branched, creeping portion, though not forming a compact disk, and an erect portion; filaments of the creeping part disiphonous for the most part, 9-12 μ diam., with cells 1-2 times as long as broad; erect filaments simple, for the most part monosiphonous but with scattered cells dividing once longitudinally, about the same diameter as the horizontal filaments, 1-1.5 mm. high, without a conspicuous apical cell; hair filaments numerous, arising only on the creeping filaments, 2-2.5 mm. long, 7-8 μ diam., with cells 6-8 times as long as the diam.; gametangia sessile or short pedicellate on the creeping filaments, or very rarely terminal on short erect filaments; loculi 6-8 seriate, 14-18 μ diam., 40-50 μ long, clavate, very blunt; propagula unknown.

Epiphytic on *Ahnfeldtia gigartinoides*.

Type: No. 173624, Herb. Calif. Acad. Sci., collected by H. L. Mason (No. 164), in June, at **Clarion Island.**

The gametangia of *Sphacelaria Masonii* resemble most closely those of *S. brittanica* Sauv., with some resemblances to those of *S. indica* Reinke. It seems to be one of the simplest of the *S. radicans* group and only one remove from *Sphacella*, in that it has occasional vertical walls usually situated just above the basal cells.

Named for Mr. H. L. Mason, botanist of the expedition on which the type specimen was collected.

Family Ectocarpaceæ

ECTOCARPUS Lyngbye, Hydrophyt. Dan., 1819, p. 130 (in part)

50. **Ectocarpus breviarticulatus** J. Ag.

Growing on rocks. Mason, No. 108, Guadalupe Island. J. G. Agardh, Nya Alg. från Mexico, 1847, p. 7.

No. 108 seems perfectly typical of this distinct and easily recognizable species. It is probably well distributed in the Pacific Ocean and in the lesser Antilles. The type locality is St. Augustin on the west coast of tropical Mexico.

51. **Ectocarpus Mitchellæ** Harv.

Growing on other algæ. Mason, No. 44. Guadalupe Island. Harvey, Ner. Bor. Amer., part I, 1852, p. 142, pl. 12 G.

Our specimens represent a somewhat shorter form than the type and agree well with *E. indicus* from Tutuila (Setchell, 1924, pp. 169, 170, fig. 34) and probably including as forms *E. virescens* Thuret and *E. guadalupensis* Crouan, etc., of the west Atlantic, Pacific, and Indian oceans.

52. **Ectocarpus Duchassaingianus** Grunow

Growing on rocks. Mason, No. 112. Guadalupe Island.

Grunow, Algæ, Novara Exped., Bot. Th., vol. 1, 1867, p. 45, plate 4, fig. 1.

Our specimens are low, tufted, sparingly branched plants, running out into long hairs at the tips. They are attached by creeping filaments. The gametangia are either young or of the megasporangial type. The species occurs in the West Indies and in the Pacific and Indian oceans. The type locality is on Guadaloupe Island, West Indies.

53. **Ectocarpus** sp.

Growing on *Laurencia sp.* Mason, No. 189. Guadalupe Island.

Our material of No. 189 is very scanty but shows a creeping base, with erect filaments 9-11 μ in diameter with long hairs above. The gametangia are 38-44 μ long and 12-15 μ wide. It recalls the *E. variabilis* of Vickers (Phyc. Barb., pl. 31) but has narrower gametangia.

STREBLONEMA Derbès and Solier, *in* Castagne, Supplem. Catal. Marseille, 1851, p. 100

54. **Streblonema codicola** sp. nov.

Plate 5, fig. 10

Creeping fronds near the surface of the host, extending among the utricles, giving rise to a few simple rhizoids (?) below and to numerous simple, typically fasciculately branched filaments above, extending beyond the surface of the host, and irregularly branched, 12-17 μ diam., with cells 2-4 times as long as the diam.; erect filaments clavate, 90-120 μ long, with cylindrical basal cell 1.5-3 times as long as broad, and dolioform cells in the ultimate ramuli, the apical cell being subspherical and 22-30 μ diam.; hair filaments sparse, arising on the erect filaments, 8-10 μ diam., with short cells at the base and up to 4 times as long as broad above; gametangia fusiform to subcylindrical, 17-23 μ diam., 75-90 μ long, with loculi in 3-4 series arising on the erect ramuli; zoosporangia unknown; chromatophores lenticular.

Growing on *Codium fragile.*

Type: No. 178640, Herb. Calif. Acad. Sci., collected by H. L. Mason (No. 193), in April, at **Guadalupe Island.**

Family Tilopteridaceæ?

55. **Masonophycus** gen. nov.

Base of prostrate, branching filaments, monosiphonous, or here and there disiphonous, emitting erect simple branches, terminated by rounded cells; reproductive organs of three (?) kinds: gametangia, tetrasporangia, and propagula (?); gametangia ovate or ovate-ellipsoidal, plurilocular, terminal, or occasionally lateral on short pedicels; tetrasporangia lateral,

seriate, secund, globular, on short pedicels, with contents cruciately divided; propagula (?) (or hypertrophied gametangia?) obovate or clavate, undivided, or divided by 1-2 transverse septa, lateral, more or less distichous.

A genus possibly of the Tilopteridaceæ, the general appearance being Ectocarpoid, but the basal filament is often disiphonous, the terminal cell is rounded, and the tetrasporangia pointing directly towards either the Ectocarpaceæ or the Sphacelariaceæ.

56. **Masonophycus paradoxa** sp. nov.

Plate 6, figs. 11 to 20

Forming low tufts about 1.5 mm. high on *Ahnfeldtia gigartinoides* J. Ag.; creeping filaments 18-24 μ in thickness, irregularly branched, attenuate at the apices, monosiphonous, occasionally disiphonous; cells usually somewhat longer than broad; erect filaments, given off at right angles, strongly attenuate at the base and gradually tapering toward the apex, 18-34 μ in diameter, slightly moniliform, the sterile usually being broader and shorter celled than the fertile, terminal cell rounded; gametangia ovate-oblong to ovate-elliptical, plurilocular, discharging through the disrupted apex, about 25 μ broad, 70-130 μ long, the terminal ones on short filaments longer than the lateral ones, the latter often with fewer and larger loculi (mega-gametangia?) with 1-2 celled pedicel; tetrasporangia secund and seriate, globular, 26-30 μ, cruciately divided, on short, 1-celled pedicels; propagula (?) clavate to balloon-shaped, lateral, more or less distichous, varied in size and form, about 60-80 μ long, and width very variable (up to 28-38 μ wide), non-septate or with 1-3 transverse septa.

Growing on rocks.

Type: No. 173628, Herb. Calif. Acad. Sci., collected by H. L. Mason (No. 186), in June, at **Clarion Island.**

A puzzling species, unfortunately represented by only a couple of small tufts. The propagula (?) are varied and seeming transitions to gametangia occur.

Family Elachistiaceæ

HALOTHRIX Reinke, Die braunen Alg., 1888, p. 16

57. **Halothrix lumbricalis** (Kuetz.) Reinke

Growing on rocks. Mason, No. 96. Guadalupe Island.

Reinke *(loc. cit.)*, p. 19, *Ectocarpus lumbricalis* Kuetzing, Phyc. Germ., 1845, p. 233.

The occurrence of this species came as a surprise, since the type locality is in the "Ostsee" where according to Reinke (Atlas, 1889, p. 1) it is a spring plant. It has been found in abundance at Revere Beach, Mass., by F. S. Collins and in Long Island Sound near Bridgeport, Conn., by Isaac Holden, in each case in May. Mason's collections at Guadalupe Island were made after the middle of April. The specimens seemed perfectly typical of the species and add a far-outlying station.

Since the above note was written, Yamada (Mar. Alg. Mutsu Bay, II, 1928, p. 513, fig. 12) has described and figured his *Halothrix ambigua*. Yamada's species is coarser, with the erect free filaments about twice the diameter of those of the Guadalupe specimen (about 40-45 μ in their broadest portions), which are closely approximate to the Atlantic species. Yamada's species also bears unilocular zoosporangia and curved, clavate, pluricellular paraphyses (after the fashion of *Elachistea)* on the same plant with the plurilocular "gametangia" characteristic of *Halothrix*.

Family Scytosiphonaceæ

COLPOMENIA Derbès and Solier, Mém. phys. Alg., 1856, p. 11

58. **Colpomenia sinuosa** (Roth.) Derb. and Sol.

A single small fragment of a specimen cast ashore. Mason, No. 177. Clarion Island.

Derbes and Solier *(loc. cit.)*. *Ulva sinuosa* Roth., Cat. Bot., vol. 3, 1806, p. 327, pl. 12.

This species, represented only by a sterile fragment, appears to belong under our f. *typica* (see Setchell and Gardner, 1925, p. 540). Sauvageau has recently (1927, pp. 309-321) discussed the status of our west coast species and concludes that it is different from the true type of the Cadiz and Mediterranean

region. The Clarion Island plant is noted here simply to call attention to its presence. It does not lend itself to investigation of the points involved in the delimitation of the sori and the dehiscence of the zoosporangia.

Family Chnoosporaceæ

CHNOOSPORA J. Agardh, Nya alger från Mexico, 1847, p. 7

59. **Chnoospora pannosa** J. Ag.

Mason, No. 66. Guadalupe Island.

J. Agardh, Sp. Alg., vol. 1, 1848, p. 172.

We have placed the Guadalupe plant under *Chnoospora pannosa* since it agrees better in habit with Kuetzing's figure (Tab. Phyc., vol. 9, pl. 87, I) than with the more regularly branched plant we are in the habit of considering *Ch. pacifica* J. Ag. The type locality of the latter is St. Augustin, on the west coast of Mexico, while that of *Ch. pannosa* is the Hawaiian Islands. We suspect it of being young and sterile, probably a battered state of *Ch. pacifica.*

DESMARESTIACEÆ

DESMARESTIA Lamouroux, Essai, 1813, p. 23

60. **Desmarestia pacifica** S. and G. (?)

Plate 12, fig. 42

Fragments cast up. Mason, No. 29. Guadalupe Island.

Setchell and Gardner, Phyc. Cont., VII, 1924, p. 6.

There are several species, indicating a large plant with heavy discoid holdfast, with lower stem terete, branches uniformly opposite, suddenly diminishing in each of the several orders and provided with fluffy bunches of short, broad hairs at the tip of each branch or branchlet. The last mentioned character is absent in the type specimen, which is imperfect and which came from Santa Catalina Island, but within the same temperature province as Guadalupe. While we have some hesitation in referring this species to *D. pacifica*, it seems at least to come close to it.

61. **Desmarestia herbacea** (Turn.) Lamour.

Cast ashore. Mason, No. 125, Guadalupe Island. Lamouroux, Essai, 1813, p. 25. *Fucus herbaceus* Turner, Hist. Fuc., vol. 2, 1809, pp. 77, 78, pl. 99.

There is no base represented among our specimens. The medium vein shows throughout, but the lateral veins are inconspicuous or invisible. The ligules are sharply toothed with the teeth long and cylindrical. It reminds us of *D. munda* S. and G., but seems much too narrow for this species.

Family Sporochnaceæ

SPOROCHNUS Agardh, Sp. Alg., vol. 1, part 1, 1820, p. 147

62. **Sporochnus pedunculatus** (Huds.) Ag.

Plate 13, fig. 43

Cast ashore. Mason, No. 11. Guadalupe Island.

Agardh, Sp. Alg., vol. 1, part 1, 1820, p. 149. *Fucus pedunculatus* Hudson, Fl. Angl., Ed. II, 1878, p. 587.

The main axis is slender, about 23 cm. long, with branches of only one order, each simple and up to 10 cm. long. The fertile ramelli, about 2 mm. long, are oblong-elliptical, attenuated below into a slender pedicel from 0.75-2.0 times as long as the fertile tip. The sporangia are broadly clavate, 25-32 μ long.

This appears to belong to the West Indian species and is one of several species of that area found in Mr. Mason's collections.

Alariaceæ

EISENIA Areschoug, *in* Bot. Not., 1876, No. 3, p. 69

63. **Eisenia (?) Masonii** sp. nov.

Plate 14, fig. 44

Stipe and holdfast unknown; blade (?) bearing numerous, complanate, bipinnately branched sporophylls 3-5 dm. long, with considerably thickened rhachis and membranaceous pinnæ and pinnules beset along the margins with numerous sharp teeth with broad bases; pinnæ stipitate in the lower parts of the rhachis, pinnules mostly not stipitate; sori on the rhachis

and at the base of the stipitate pinnules, not extensive; unilocular sporangia intermingled with unicellular paraphyses provided with hyaline appendages at their tips.

Brought up from deep water with the ship's anchor.

Type: No. 173700, Herb. Calif. Acad. Sci., collected by H. L. Mason (No. 5), in April, at **Guadalupe Island.**

There were two sets of fragments, this number and the next, which came to the surface during the hoisting of the anchor. This species was provided with scanty sori whose sporangia and paraphyses were clearly of a Laminarioid type. We can only suspect that these fragments may represent portions of the lateral sporophylls of some Alarioid genus similar to *Eisenia.*

64. **Eisenia (?) desmarestioides** sp. nov.

Plate 15, fig. 45

Stipe and holdfast unknown; blade (?) giving rise to numerous complanate, bipinnately branched sporophylls up to 4 dm. long, with much thickened rhachis and numerous alternate pinnæ and pinnules with deeply serrated margins; pinnæ and pinnules linear, stipitate finely bullate over their entire surface; reproduction unknown. Brought up from deep water on the ship's anchor.

Type: No. 173701, Herb. Calif. Acad. Sci., collected by H. L. Mason (No. 6), in May, at **Guadalupe Island.**

Very similar to the last in general characters and obtained in the same way. The single specimen is narrow and the surface bullate. It recalls *Carpoglossum quercifolium* (Turn.) J. Ag. (cf. Harvey, Phyc. Austr., vol. 1, pl. 43, 1858) in outline but is thinner and Laminarioid rather than Fucoid. We suspect it to be part of a sporophyll of some such genus as *Eisenia,* although the specimen is sterile. No such degree of branching is known among the sporophylls of any *Eisenia,* but a suggestion is to be found in those of *Eisenia bicyclis* (Kjellm.) Setchell and *E. cava* (Kjellm.) Okam. (cf. Kjellman, *in* Engler and Prantl, Die Naturl. Pfl.-fam., I Teil, Abth. 2, p. 245, p. 166, B, and Vega. Exp. Vetensk. Jakt., Bd. IV,

pl. 10, 1885). *Eisenia arborea* Aresch., the only species on the west coast of North America has usually simple sporophylls as has also *E. Cokeri* Howe from the coast of Peru. The Japanese species of *Eisenia* and *Ecklonia* are to be considered, but no one of them has such extremely compound sporophylls as the two sets of specimens before us.

Family Cutleriaceæ

AGLAOZONIA Zanardini Saggio, 1843, p. 10

65. **Aglaozonia canariensis** Sauv.

Mason, No. 176. Clarion Island.

Sauvageau, Observ. sur quelq. Dictyotaceæ, 1905.

Resembling sterile plants of *Zonaria variegata* (Lamour.) Ag., but the differences between the dorsal and ventral epidemis and the scattered moniliform rhizoids lead us to suggest the possibility of being near to, if not identical with, the *Aglaozonia canariensis* of Sauvageau, a species originally described from the Canary Islands but apparently occurring throughout the West Indies. It is a very different plant from the *A. pacifica* Setchell, from Tahiti.

Family Dictyotaceæ

DICTYOTA Lamouroux, Nouv. Bull. Soc. Philom., vol. 1, 1809, p. 331

66. **Dictyota cribrosa** sp. nov.

Plate 11, fig. 40

Fronds light brown, perforated irregularly, narrow below, expanding upwards, flabellately divided above the middle, the branches appearing as lobes at the summit, over 8 cm. long (basal portions wanting), 4-5 mm. broad below, 2-5 cm. across the flabellate expansions, 6-7 mm. diam. in upper divisions; all divisions cuneate, thin and fragile, 85-110 μ thick, middle cells clear; margins ciliate-dentate, teeth 1 mm. long, slender, scattered, more or less regularly, with scattered hair clusters and broadly oblong oogonia in subcircular sori; antheridia and aplanospores unknown; surface cells elongated, 4-5 to each central cell.

Cast ashore.

Type: No. 173683, Herb. Calif. Acad. Sci., collected by H. L. Mason (No. 3), in May, at **Guadalupe Island.**

The present species resembles most nearly *Dictyota crenulata* J. Ag., but differs from that species as we have interpreted it (Mar. Alg. Gulf. Calif., 1925, p. 730, pl. 18, figs. 50, 51) in being somewhat taller and broader, more flabellately branched above, in being somewhat thinner *(D. crenulata* is 130 μ and over thick) and having the central layer of cells clear instead of colored.

67. **Dictyota Masonii** sp. nov.

Fronds 4-7 cm. high, 2-3 mm. wide, dichotomo-pinnate, slightly stupose at the base; segments linear, with smooth margins below and rounded but narrow angles; distance between main branches 4-6 mm.; apices mostly blunt; surface cells 10-14 μ diam., 2-3 times as long as the diam.; central layer of cells 45-55 μ diam. and about twice as long, with a single group of chromatophores in the center; marginal cells thickened and meristematic, giving rise to numerous proliferations above but soon falling off and producing new plants; reproduction unknown.

Cast ashore.

Type: No. 173614, Herb. Calif. Acad. Sci., collected by H. L. Mason (No. 22), in June, at **Clarion Island.**

No. 22 differs from *D. dentata* of the West Indies by being broader in habit and lacking acute tips. It lacks the dichotomies of *D. Bartayresii* and *D. Vivesii* Howe. The callose margins seem to distinguish it.

68. **Dictyota** sp. ?

Cast ashore. Mason, No. 14, Clarion Island.

No. 14 recalls both *D. Bartayresii* Lamour. and *D. pardalis* Kuetz., but does not agree with either. The plants are low and sterile, possibly they are young. A basal transverse section is about 260 μ thick, the large cells are higher than wide

and the outer cells are nearly quadrate. The marginal cells are conspicuous for their deep brown contents.

NEUROCARPUS WEB. AND MOHR, Beiträge zur Naturkunde, vol. 1, 1805, p. 300

69. **Neurocarpus delicatulus** (Lamour.) O. Kuntze.

Cast ashore. Mason, No. 158. Clarion Island. O. Kuntze, Rev. Gener. plant., 1891, p. 907.

Dictyopteris delicatula Lamouroux, *in* Nouv. Bull. Philom., 1809, n. 20, pl. 6, fig. B.

A small, delicate, sterile plant, seemingly referable here, occurred in small quantity among the Clarion Island collections. It is found in the Atlantic and in the Indian oceans.

ZONARIA AG. *(lim. mut.)*, Syn. Alg. Scand., 1817, p. XX

70. **Zonaria Farlowii** S. and G.

Cast ashore at Guadalupe Island, Mason, No. 4. Setchell and Gardner, Mar. Alg. Pac. Coast, Part III, 1925, p. 660, pl. 34, fig. 5, pl. 36, fig. 20, pl. 43, fig. 63, and pl. 97.

The plants referred to this species are slender and ragged, even naked below. They bear oogonia and their attendant paraphyses.

PADINA ADANSON, Fam. II, 1763, p. 30

71. **Padina tetrastromatica** Hauck?

Plate 8, fig. 41

Cast ashore. Mason, No. 100, Maria Madre Island, Mexico. Hauck, *in* Hedwigia, 1887, p. 43.

Our specimens bear antheridia which occur in a zone on each side of a zone of hairs. About the middle, the frond consists of 6 layers of cells. As to indusium, there seems to be none, but none of the antheridia is as yet sufficiently mature to show dehiscence. Seemingly a somewhat thicker plant than those of either Hauck or Weber-van Bosse. It is a species of the Indian Ocean.

72. **Padina Durvillei** Bory.

Cast ashore. Mason, No. 101. Maria Madre Island, Mexico.

Bory, *in* Dict. Class. Hist. Nat., vol. 12, 1827, p. 591.

Our specimens are thick and dark-colored even in alcoholic specimens. The inner layers of cells number 6 to 8, with the colored surface layers. They are sterile, with irregular concentric zones of dark hairs. The type is from Chile.

Family Sargassaceæ

BLASSEVILLEA Decaisne, Sur Thallas., 1840, p. 409

73. **Blossevillea Brandegeei** S. and G.

A single fragment, cast ashore. Mason, No. 2. Guadalupe Island. Setchell and Gardner, *in* Gardner, Nuclear Extrusion, 1910, p. 127, pl. 16, figs. 8-10.

Only a fragment of this species, described from and limited, so far as is known, to Guadalupe Island, was found in the collections. There are a few conceptacles but nothing of a basal portion.

SARGASSUM Agardh, Sp. Alg., vol. 1, 1820, p. 1

74. **Sargassum Palmeri** Grunow

Cast ashore. Mason, Nos. 1, 25, 85, and 92. Guadalupe Island. Grunow, Add. cog. Sargass., 1915, p. 338.

Typical plants of this Guadalupe species were collected. They show both oogonia and antheridia. It was first collected by Dr. Edward Palmer in 1875 and later by T. S. Brandegee. It occurs floating and possibly attached as far north as Santa Cruz (A. Grunow!).

75. **Sargassum paniculatum** J. Ag.

Guadalupe Island, Dr. Edward Palmer, 1875. J. G. Agardh, Sp. Alg., I, 1848, p. 315.

There are specimens in Herb. Univ. California and Herb. Farlow, determined by Major Th. Reinbold.

RHODOPHYCEÆ

Family BANGIACEÆ

GONIOTRICHUM KUETZING, Phyc. Gen., 1843, p. 244

76. **Goniotrichum Alsidii** (Zan.) Howe

Epiphytic on various algæ. Guadalupe Island, Mason, No. 154, and scattered specimens in various other collections. Howe, Mar. Alg. Peru, 1914, p. 75. *Bangia Alsidii* Zanardini, Bibl. Ital., vol. 96, 1839, p. 136.

Filaments forking at an angle of about 45°, 10-12 μ in diameter, with cells in a single row, occurred in various preparations. They seem to belong to this species as usually understood.

Family GELIDIACEÆ

GELIDIUM LAMOUROUX, Essai, 1813, p. 41 (Repr.)

77. **Gelidium microphysa** sp. nov.

Plate 9, fig. 31

Fronds compressed throughout, 1-1.5 cm. high, main axis up to 1.25 mm. diam., flabellately branched, with branches numerous and short; apical cell in a conspicuous notch; cystocarpic ramuli spatulate, constricted at the base; surface cells spherical, 4-5 μ diam.; rhizoidal filaments abundant, fairly evenly distributed in the subcortex and medulla; tetraspores and antheridia unknown.

Growing on rocks.

Type: No. 173635, Herb. Calif. Acad. Sci., collected by H. L. Mason (No. 121), in April, at **Guadalupe Island.**

The specimens are short and broad, resembling most nearly *Gelidium micropterum* Kuetz. (Tab. Phyc., vol. 18, p. 21, pl. 59, figs. e-g, 1868) in habit, terminal cell sunk in a broad shallow notch, and the position of the cystocarp. *G. micropterum* is credited to Cape Colony and has been referred to *G. cartilagineum* by J. G. Agardh with a query. We have not seen a specimen of Kuetzing's species and since ours is shorter, broader, and far removed in locality, feel inclined to bestow upon it a provisional name until its identity may be more clearly established. It is difficult for us to associate either our

specimens or those of Kuetzing with the very different *G. cartilagineum*. The species is named *microphysa* because of the minuteness of the superficial cells.

Family Gigartinaceæ

AHNFELDTIA Fries, Fl. Scan., 1835, p. 310

78. **Ahnfeldtia gigartinoides** J. Ag.

Growing on rocks, Clarion Island, Mason, No. 33.

J. Agardh, Nya Alg., 1847, p. 12.

The Clarion Island plants are the low, scrubby, irregularly branched plants of the type illustrated by Kuetzing (Tab. Phyc., vol. 19, 1869, p. 26, pl. 71a-e) rather than the symmetrically branched dichotomous plants of the Hawaiian *A. concinna* J. Ag. We suspect, however, that the two species may be identical. The type locality is St. Augustine, western coast of Mexico, where it was collected by Liebman. Kuetzing's figures are of Liebman's plants.

MYCHODEA Hooker and Harvey, *in* London Journ., vol. 6, 1847, p. 407

79. **Mychodea episcopalis** J. Ag. (?)

A few fragments among other algæ, cast ashore at Guadalupe Island. Mason, No. 167.

J. Agardh, Till. Alg. Syst., VII, 1885, p. 82.

The only complete specimen is a dwarf (or dwarfed) plant about 3 cm. long. It has the same structure as the type specimen and the cystocarp of the Gigartinaceæ. It is not only smaller than the type of *Mychodea episcopalis* J. Ag., but it shows no coiled tips. It may be an undescribed species related to *M. pusilla* (Harv.) J. Ag., but in that species the cystocarps are subterminal, while in ours they are well below the terminal region.

Family Sphærococcaceæ

GRACILARIA Greville, Alg. Brit., 1830, p. 121

80. **Gracilaria crispata** S. and G. f. (?)

Growing on rocks. Mason, No. 178, Clarion Island.

Setchell and Gardner, New. Mar. Alg., 1924, p. 753, pl. 22, figs. 7-10, and pl. 44,a.

The fronds are clustered, very little over 1 cm. high, attenuated into a flattened stipe below, expanding into a flabellate, palmate expansion above, whose divisions are irregularly crisped or lacerate. The structure, as well as the habit in miniature, suggests close relationship to the Gulf of California species.

Family RHODYMENIACEÆ

CHAMPIA DESVEAUX, Journ. Bot., vol. 1, 1808, p. 245

81. **Champia parvula** (Ag.) Harv.

A few fragments cast ashore among minute algæ. Clarion Island. Mason, No. 74.

Harvey, Ner. Bor. Amer., part 2, 1853, p. 76. *Chondria parvula* Agardh, Syst. Alg., 1824, p. 207.

Only fragments occur in the Clarion Island collection. The filaments are up to 600 μ in diameter. The tetrasporangia are tripartite and scattered. It seems to belong to this species attributed to the Atlantic Ocean, the Mediterranean Sea, the East Indies, and Japan.

HOOPERIA J. AGARDH, Anal. Algol., cont. 3, 1896, p. 89

82. **Hooperia Baileyana** (Harv.) J. Ag.

A few small specimens, on Eel Grass. Mason, No. 72, and on *Sargassum* sp., No. 91, South Anchorage, Guadalupe Island.

J. G. Agardh *(loc. cit)*, p. 90. *Chylocladia Baileyana* Harvey, Ner. Bor. Amer., part 2, 1853, p. 185, pl. XX, C.

What seems to be this fairly common species of East Atlantic United States and the West Indies, occurs in the Clarion Island material. No. 72 is typically tetrasporic while No. 91 shows antheridia covering the entire surface of the large portion of the upper part of the branchlets.

Family HYPNEACEÆ

HYPNEA LAMOUROUX, Essai, 1813, p. 43

83. **Hypnea Evermannii** sp. nov.

Fronds densely branched, having 3-5 orders of branches, rigid and somewhat cartilaginous; primary branches mainly

standing at right angles to the more or less contorted main axis, 3-4 cm. long, these in turn branching subdichotomously; main axis and ramuli densely clothed with perpendicular, ultimate fructiferous ramuli, these occasionally forked, with acute apices and not constricted at the base; antheridia in rather extensive, somewhat swollen sori at or near the base of the fructiferous ramuli; cystocarps and tetraspores unknown.

Cast ashore.

Type: No. 173625, Herb. Calif. Acad. Sci., collected by H. L. Mason (no. 21), in April, at **South Anchorage, Guadalupe Island.**

Unfortunately only a fragment of an antheridial plant of this seemingly distinct species of *Hypnea* was collected, hence a complete diagnosis of the species is not possible at this time. It seems close to *H. Marchantæ* S. and G. and *H. Johnstoni* S. and G., both from the Gulf of California, and to the Red Sea *H. Valentiæ* (Turn.) Mont., but the spinulose ramellæ are mostly simple in *H. Evermannii* and only occasionally forked.

Family Bonnemaisoniaceæ

ASPARAGOPSIS Montagne, *in* Webb and Berthelot, Phyt. Canar., vol. 3, part 3, 1840, p. XV

84. **Asparagopsis Sanfordiana** Harv.

Cast ashore. Clarion Island, Mason, No. 13. Harvey, *in* Trans. Royal Irish Acad., vol. 22, part 5, 1855, p. 544.

Our plants seem to be closer to the typical form than to the f. *amplissima* S. and G. of the Gulf of California.

Family Rhodomelaceæ

RICARDIA Derb. et Sol., *in* Derbès, Ann. Sci. Nat. Bot., 4 Sér., vol. 5, 1856, p. 211, pl. 14

85. **Ricardia Montagnei f. gigantea** Farlow

Growing on *Laurencia Masonii*. Guadalupe Island, Mason, No. 132.

Farlow, *in* Farlow, Anderson, and Eaton, Alg. Exsicc. Am.-Bor., No. 58, 1878 *(nomen nudum)*.

Only a few small specimens were encountered, growing on the tips of *Laurencia Masonii*. The smallest plants bearing tetrasporangia reached only 0.5 mm. in height, while the Californian plants, as a rule, are much larger than those described for the type of the species. The variety is therefore of doubtful status.

Kylin (Entwick. Florid., 1928, p. 94-102) has recently resurrected for this species the specific name *saccata* of J. G. Agardh (Oefvers. Act. Holm, 1849, p. 89), which, however, is a manuscript name applied by Greville to a Californian plant seemingly under the impression that the plant in question belonged to the *Dumontia saccata* of his synopsis (Alg. Britt. Syn., p. lxii, 1830), which in turn was founded on the *Fucus saccatus* Turn. (Fuci, pl. 241). Greville, seemingly, intended to refer the plant described by J. G. Agardh to what we now call *Halosaccion fucicola* (or *H. glandiforme),* but J. G. Agardh, while taking Greville's name, recognized the generic difference between Greville's plant and Turner's. J. G. Agardh also, seemingly confirming Greville's use of the name, later (1876, p. 369) renamed the species *Erythrocystis Grevillei,* thus disposing of any suspicion that he considered himself responsible for the specific name *"saccata."* It is, in our estimation, a questionable application of the priority rule to select the specific name *"saccata"* in preference to the long established *"Montagnei"* conferred by Derbès and Solier in 1856 *(loc. cit.).*

LAURENCIA Lamouroux, Essai, 1813, p. 43

86. **Laurencia Masonii** sp. nov.

Fronds 12-20 cm. high, repeatedly and profusely branched, with branches of 6-8 orders, widely divaricate and each reduced in size; main axes up to 3.5 mm. diam.; fructiferous ramuli very abundant, clavate, constricted slightly at the base, more or less fasciculately branched; superficial cells thin-walled, pentagonal or hexagonal, 25-30 μ diam., slightly longer than broad in the main branches, shorter than broad at the apices of the ramuli; large medullary cells with much thickened walls on one-half of the cell, the thickening crescent-shaped in cross section; fascicles of hair filaments included

within the apical pits; tetrasporangia 90-120 μ diam.; antheridia and carpogonia unknown.

Cast ashore and growing on *Sargassum Palmeri.*

Type: No. 173698, Herb. Calif. Acad. Sci., collected by H. L. Mason (no. 8), in April, at **South Anchorage, Guadalupe Island.**

The proposed new species described above seems to come nearest to *Laurencia heteroclada* Harvey of West Australia. It belongs to the *Filiformes* section of the genus but does not show the heteromorphy of Harvey's plant. It resembles the more prominently branched forms of *L. Forsteri* (Mert.) Grev., but is even more frequently branched, with branchlets more attenuate at their bases.

87. **Laurencia humilis** sp. nov.

Plate 9, figs. 32 and 33

Fronds diminutive, 8-15 mm. high, 1-2 mm. diam., very sparsely branched; medullary cell without crescent-shaped thickenings of the walls; surface cells quite variable in shape and size, mainly subcircular in surface view, up to 30 μ diam.; subcortical cells very much larger; chromatophores parietal, forming a network of crooked rods; tetrasporangia crowded at the outer ends of the filaments; cystocarps unknown; antheridia in dense, grapelike, much branched clusters, each branchlet terminated by a large spherical cell.

Growing on rocks.

Type: No. 173627, Herb. Calif. Acad. Sci., collected by H. J. Mason (No. 175), in April, at **Clarion Island.**

This dwarf (or dwarfed) species seems distinct from any described, being nearest, perhaps, to *L. nana* M. A. Howe of the West Indies. It is stouter than that species and its branchlets are shorter and more stubby and it has the epidermal cells more circular to elliptical in surface view than in *L. nana.* The chromatophores are parietal, slender and crooked, forming a regular but labyrinthine figure lining the cell wall (see plate 9, fig. 33). While it may be only a low form or state of some other species, it seems mature, since the specimens show both tetraspores and antheridia.

88. **Laurencia papillosa var. pacifica** S. and G.

Growing on rocks. Guadalupe Island, Mason, No. 119.

Setchell and Gardner, Mar. Alg. Gulf Calif., 1924, p. 765, pl. 23, fig. 18; pl. 24, fig. 33; pl. 43a-b, and pl. 54.

The specimens referred under this tropical species agree with the varietal type in all essential characters. The cortical cells are more rounded, 12-25 μ in greatest diameter (often the horizontal diameter) and the tetrasporangial ramelli are broad turbinate with a single ring (constant?) of tetrasporangia at the top.

89. **Laurencia** sp. nov.?

Plate 8, fig. 30

Fronds prostrate, attached by short, broad disks, giving rise on the opposite side to numerous short, unbranched, clavate filaments; erect filaments similar to fructiferous ramuli in other species of *Laurencia* and with the surface cells subspherical, 25-30 μ diam., projecting, giving the surface a finely tuberculate appearance; prostrate filaments and apices of the erect filaments 230-300 μ diam.; erect filaments up to 2 mm. diam.; reproduction unknown.

Cast ashore, probably growing on rocks among various other small algæ. Mason, No. 165, Guadalupe Island.

Only a small fragment of this most interesting and, so far as the incomplete fragment shows, most distinct plant is available. The prostrate stem is 7.5 mm. long, cylindrical, about 230 μ thick, with smooth epidermis and with the walls of the intermediate cells strongly thickened, the thickenings often locally placed and often just below an erect branch or near a fascicle of rhizoids. It is attached to the substratum by fascicles of rhizoids. The erect branches are cylindrical, about 1.5 mm. long, slightly and gradually attenuate at the base. The cortical cells of the erect branches project, giving them a distinctly papillose appearance. The fragment is sterile.

Several species, seemingly of the same general habit, have been described and figured by Kuetzing in the fifteenth volume of the Tabulæ Phycologicæ. They are *Laurencia perforata* Mont. (pl. 49, e-g), from the Canary Islands, *L. radicans* Kuetz. (pl. 50, d-e) from the Adriatic Sea, and *L. vaga* Kuetz.

(pl. 50, a-c), and *L. decumbens* Kuetz. (pl. 51, a, b) from New Caledonia. *L. microcladia* Kuetz. has a creeping base and thickenings of the walls of the intermediate cells, but is not papillose, while *L. gemmifera* has papillose cortical cells but no thickenings of the walls of the intermediate cells.

It seems unwise to name and attempt to describe our plant from a fragment showing so little of the habit, but we call attention to its peculiarities in the hope that it may occur again in more complete form.

JANCZEWSKIA SOLMS-LAUBACH, Note sur le *Janczewskia*, etc., 1877

90. **Janczewskia Solmsii** Setch. and Guern.

Parasitic on *Laurencia Masonii*. Guadalupe Island, Mason, No. 93.

Setchell and Guernsey, *in* Setchell, Parasitic Florideæ, I, 1914, p. 9, pl. 2, figs. 7, 8; pl. 3, figs. 17-19, pl. 5, figs. 26, 27.

While our plant agrees too closely with *Janczewskia Solmsii* to be separated from it and shows tetrasporangia, antheridia, and cystocarps, the cystocarpic conceptacles are broad and there are sterile tips. These last, perhaps, show that the specimens are young.

CHONDRIA AGARDH, Syn. Alg. Scand., 1817, p. XVIII

91. **Chondria clarionensis** sp. nov.

Fronds 2-3 cm. high, nearly 1 mm. diam. at the base, tapering to acute apices, rigid; branches of at least three orders, arising on all sides, widely divaricate; trichoblasts numerous, profusely branched, growing on the acute tip of the branch as well as on the tips of short secondary branchlets, in pits or depressions for some distance back of the apices, then becoming decidious; ultimate ramuli constricted at the bases, abruptly tapering to acute apices; cortical cells in surface view 8-15 μ diam., 2-4 times as long, subcortical layer composed mostly of two layers, larger than the surface cells; medullary cells subspherical, up to 125 μ diam., colorless, with lenticular thickenings on the walls; antheridia thin, circular disks, 300-350 μ diam.; cystocarps short stipitate, 0.5-0.75 mm. diam., with broadly pyriform carpospores 200-230 μ long.

Cast ashore.

Type: No. 173631, Herb. Calif. Acad. Sci., collected by H. L. Mason (No. 18) at **Clarion Island.**

The plants referred to this species are very low, yet they bear well developed tetrasporangia, antheridia, and cystocarps. The trichoblasts are on an emergent conical tip, not sunk in a depression. The branchlets are few, inclined towards distichous in arrangement, but all the axes are cylindrical. It is a member of the Euchondria section. It has lenticular thickenings of the walls of the medullary cells, short stipitate cystocarps, straight tips to the branches and branchlets, with cortical cells 8-15 μ by 30-45 μ as to prostoplast and with walls 3-4 μ thick in the antheridial plant. Our species comes nearest to *Ch. acrorhizophora* S. and G. of the Gulf of California, but has very different cortical cells and shows no tendency towards cirrhate tips.

92. **Chondria** sp.

Growing among other algæ. Mason, No. 168. Guadalupe Island.

Our plant comes nearest to *Chondria tenuissima,* credited with wide range. The habit and tetrasporangia agree with English specimens. The cortical cells agree closely in shape and measurements, the protoplasts averaging 1.5 times as long as broad. There are no lenticular thickenings in the walls of the intermediate cells nor any rhizoidal or circinate appendages at the tips of either branches or branchlets. The chromatophores appear discoid below and in the form of a broken band near the apex. It comes near to the var. *californica* Collins but does not agree exactly. It is acute at the tips, resembling *Ch. lanceolata* Harv., is low, generally naked or with few trichoblasts, and has some tendency toward distichous arrangement of branchlets. The bases of the branchlets are not so extremely attenuated as is represented for *Ch. lanceolata* and we have no exact information concerning the cortical cells or possibility of internal thickenings of walls in that species. It arises from a prostrate rooting basal portion.

POLYSIPHONIA Greville, Fl. Edin., 1824, p. 308

93. **Polysiphonia tongatensis** Harv. var. (?)

Fronds at least 2.5 cm. high and 130-145 μ diam., flaccid, sparsely branched, with 4 pericentral cells; branches strict, very gradually attenuated upwards, crowned by a group of long, dichotomously branched hairs remaining attached to 20-30 segments back of the apices; segments about 2 times as long as broad below; chromatophores discoid; long unicellular rhizoids arising from the pericentral cells at various levels along the frond; tetrasporangia more or less discontinuous, arising in the subultimate ramuli, nearly filling the segments, spirally arranged; cystocarps and antheridia unknown.

Cast ashore, entangled among other small algæ. Mason (No. 130), South Anchorage, Guadalupe Island.

Harvey, *in* Kuetzing, Tab. Phyc., vol. 14, 1864, p. 14, pl. 41, fig. a-d.

We have only a fragment of a tetrasporangial tip, but this agrees well with plants of the central Pacific referred to this species and particularly to var. *upoluensis* Grun. The base, critical in determination for species of this group of *Polysiphonia,* is unfortunately lacking. Our fragments recall also the figure of *Polysiphonia siamensis* Martens (Tange, Preuss. Exp. n. Ost. As., 1866, p. 31, pl. 7, fig. 1). In case *P. tongatensis* Harv. and *P. siamensis* prove identical, Harvey's name as published by Kuetzing (Tab. Phyc., vol. 14, 1864, p. 14, pl. 41, figs. a-d) has priority. Martens' species, however, is rooting above and is said to have 4-6 pericentral cells.

94. **Polysiphonia Masonii** sp. nov.

Fronds flaccid, attached by a dense fascicle of short, rhizoidal filaments terminating in discs, of a reddish-brown color, 2-3 cm. high, 350-400 μ diam. at the base of the main axis, repeatedly and regularly dichotomously branched, with the branches gradually reduced in diameter toward the apices; pericentral cells 4, surrounding a relatively large central filament; segments less than quadrate below, slightly more than quadrate in the median parts, reduced to one-half or one-third at the apices; ultimate ramuli 140-150 μ diam., abruptly at-

tenuated at the apices, crowned with fairly numerous, long, dichotomously or trichotomously branched hairs; tetrasporangia spherical, spirally arranged in the ultimate and subultimate segments, 85-95 μ diam.; antheridial clusters moderately abundant, arising on the basal cell of the hairs, broadly and irregularly fusiform, 80-95 μ diam., terminated by a single small sterile cell; cystocarps spherical to subspherical, almost sessile, 300-325 μ diam.; carpospores narrowly pyriform, 100-125 μ long.

Growing on *Zostera marina*.

Type: No. 173618, Herb. Calif. Acad. Sci., collected by H. L. Mason (No. 86), in April, at **Guadalupe Island.**

Polysiphonia Masonii seems to answer most nearly to the description and figures of *P. Blandi* Harv. (Phyc. Austr., vol. 4, pl. 184, 1862) as to regularity and dichotomy of frond, but the joints are longer and the ultimate ramelli more slender and gradually attenuate in that species, while in our plant they are more blunt above (when mature) and abruptly contracted below the trichoblast covered short tip. The stichidia in *P. Blandi* are zig-zag with the tetrasporangia projecting while in our plant they are submerged and the ramuli are smooth.

95. **Polysiphonia Eastwoodæ** sp. nov.

Fronds attached by a disk, relatively rigid, moderately branched, 8-11 cm. high, 350-400 μ diam. at the base, with 4 very large pericentral cells surrounding a relatively small central filament, not corticated, of a dark brownish-red color; branches strict, relatively long, gradually tapering upwards; segments up to 1 mm. long in the lower parts of the main axes, gradually diminishing in length to the apices; trichoblasts in small, relatively short tufts at the apices, subdichotomously branched; tetrasporangia spherical, arranged spirally in much swollen segments of the ultimate ramuli; 90-110 μ diam.

Cystocarps and antheridia unknown.

Growing on rocks.

Type: No. 173674, Herb. Calif. Acad. Sci., collected by H. L. Mason (No. 55), in April, at **South Anchorage, Guadalupe Island.**

Named for Miss Alice Eastwood, curator, Department of Botany, California Academy of Sciences.

Polysiphonia Eastwoodæ belongs to the group of uncorticated, 4-siphoned species, with a discoid holdfast and "leaves." In these characters, singly or in combination, it is excluded from *P. tongatensis, P. Olneyi,* and *P. subtilissima,* and is to be distinguished from *P. havanensis, P. mollis,* etc., by its not being monopodial in its branching and by the basal attachment. It differs from *P. gorgoniæ* Harv. in its shorter segments.

96. **Polysiphonia homoia** sp. nov.

Fronds soft and flaccid, sparsely branched, attached to the host by numerous long, contorted, unbranched, monosiphonous, nonseptate, thick-walled, rhizoidal filaments, 3-6 cm. high, 350-370 μ diam. at the base, with 5 relatively large pericentral cells, but usually 3 at the base of the ramuli; segments 1.5-2 times as long as broad; primary branches apparently dichotomous below, giving rise to secondary and tertiary branches above; ultimate ramuli very much reduced in length and diameter and usually constricted perceptibly at the base; trichoblasts absent or very sparse, when present very slender and sparsely branched; tetrasporangia elongated, arranged in a straight series, 110-120 μ diam., nearly occupying the entire length of the segments; antheridia in small conical clusters terminated by 2-3 sterile cells, remaining attached for 20-30 segments back of the apices; 50-60 μ diam., 170-190 μ long; cystocarps immature.

Growing on *Codium* sp.

Type: No. 173641, Herb. Calif. Acad. Sci., collected by H. L. Mason (No. 35), in April, at **Guadalupe Island.**

Polysiphonia homoia approaches *P. variegata* (Ag.) Zanard., but is low, uncorticated, more slender, and constantly 5-siphonous. Its habit of being epiphytic on *Codium* may also be characteristic.

97. **Polysiphonia guadalupensis** sp. nov.

Fronds 3-6 cm. high, 1-1.25 mm. diam. at the base of the largest axes, branching dichotomous, moderately abundant,

with branches widely divaricate, even at times recurved, corticated below; branches gradually attenuated upward, terminating in a dense cluster of long, repeatedly and dichotomously branched, very slender trichoblasts; pericentral cells 5, very large, surrounding the very small central filament one-third to one-half as long as the diam. of the filament; tetrasporangia spirally arranged, extending through two or more orders of ultimate and subultimate ramuli, 75-85 μ diam.; antheridia in typical clusters at the apices of the fronds, subconical to cylindrical, 280-320 μ long; cystocarps ovoid, relatively large, on short pedicels, standing almost erect; carpospores relatively large and sparse.

Growing on *Sargassum Palmeri.*

Type: No. 173639, Herb. Calif. Acad. Sci., collected by H. L. Mason (No. 24), in April, at **Guadalupe Island.**

The present species is another 5-siphonous plant, more or less corticated towards the robust base, displaying much of the habit of *Polysiphonia violacea* (Roth.) Grev., but constantly showing 5 instead of 4 pericentral cells. It is more definitely corticated than is usual in *P. variegata* (Ag.) Zanard, and more rigid and bushy in appearance.

FALKENBERGIA Schmitz, *in* Schmitz and Falkenberg, Rhodomelaceæ, *in* Engler and Prantl., Naturl. Pflanzenfam., 1897, p. 479

98. **Falkenbergia Hillebrandtii** (Bornet) Falkenb.

Growing on *Codium* sp. Guadalupe Island, Mason, No. 128.

Falkenberg, Rhodomelaceæ, 1901, p. 689. *Polysiphonia Hillebrandtii* Bornet, *in* Ardissone, Phyc. Med., vol. 1, 1883, p. 376.

Our specimens are sterile. The diameters of the main filaments are about 50 μ. The Guadalupe plants resemble those from the Bermuda and Bahama Islands. As to how distinct *F. vagabunda* (Harv.) Falk. and *F. rufo-lanosa* (Harv.) Schmitz are from each other and from *F. Hillebrandtii* must remain a question not to be satisfactorily decided apart from abundance of material of the Tasmanian and southwest Australian plants.

HERPOSIPHONIA NAEGLI, *in* Schleid. und Naeg., Zeits. Wiss. Bot., vol. 3, 1846, p. 238

99. **Herposiphonia tenella** (Ag.) Ambronn

Cast ashore among other algæ. Clarion Island, Mason, No. 159.

Ambronn, Botan. Zeit., vol. 38, 1880, p. 197, pl. 4, figs. 9, 11, 13, 16.

Our single specimen is a fragment which agrees so far as it goes with M. A. Howe's specimens from the Bahama Islands. There is also a slender filament accompanying the one we have assigned to this species which has fewer siphons, which may be a variant or may belong to another species.

100. **Herposiphonia rigida var. laxa** var. nov.

Plants more slender in all their diameters and less rigid than in the species and with the branches of unlimited growth developing only slightly except at irregular intervals.

Only tetrasporic plants were found, cast ashore among other small algæ.

Type: No. 173623, Herb. Calif. Acad. Sci., collected by H. L. Mason (No. 126), in April, at **Guadalupe Island.**

This seems to be only a lax and more slender form than the type of the species.

HETEROSIPHONIA MONTAGNE, Prod. Phyc. Pol. Antarct., 1842, p. 4

101. **Heterosiphonia subsecundata** (Suhr) Falkenberg

South Anchorage, Guadalupe Island. Mason, No. 49. Falkenberg, Rhodomelaceæ, 1901, p. 643, pl. 18, fig. 20. *Dasya subsecundata* Suhr, *in* Flora, 1840, p. 280.

Both antheridial and sterile plants were collected. They seem to be typical of this species of the western coasts of both North and South America.

DASYA AGARDH, Syst. Alg., 1824, p. XXXIV

102. **Dasya Stanfordiana** Farlow

A fragment cast ashore among other algæ, Guadalupe Island, Mason, No. 151.

Farlow, Algæ, *in* Robinson, Flora of the Galapagos Islands, 1902, p. 94.

Fragments, corticated to the extreme apex, seem to agree with Farlow's description and show a much more compact and corticated plant than *Dasya pacifica* Harv. when compared with a paratype of Harvey's species. It is a much denser plant than *D. arbuscula* (Dillw.) Ag. Our scanty specimens show both tetrasporangia and antheridia.

103. **Dasya Eastwoodæ** sp. nov.

Main axis alternately branched, both axes and branchlets densely corticated, the axes and especially the branchlets giving rise to numerous, alternately arranged ramuli; the ramuli monosiphonous, dichotomously branched in all directions, with branches widely divaricate and gently incurved, the older cylindrical throughout, the younger slightly tapering to blunt apices; cells of the mature ramuli 55-60 μ diam., 1.5-2.5 times as long, with numerous, parietal, more or less crooked and elongated, discoid chromatophores and thick cell walls; stichidia ovate-lanceolate in outline, truncate below, gradually tapering above, on 2-3 celled pedicels arising as one of the dichotomies of the third or fourth order, forming a zone in the middle third of the branchlet region; antheridia and cystocarps unknown.

Cast ashore.

Type: No. 173638, Herb. Calif. Acad. Sci., collected by H. L. Mason (No. 27), in April, at **Guadalupe Island.**

We possess a fragment only about 2 cm. long but showing the branching and the stichidia. It resembles most closely *D. arbuscula* (Dillw.) Ag., but the ramelli are much more slender.

104. **Dasya** sp.

A sterile fragment of much more slender and less corticated species than either of the preceding, was collected at Guadalupe Island. Mason, No. 170.

We mention this fragment of an unidentifiable *Dasya,* simply to call attention to the undoubted existence of a third species of this genus on Guadalupe Island.

COLACODASYA Schmitz, *in* Engler und Prantl, Natürl. Pflanzenfam., 1897, p. 473

105. **Colacodasya sinicola** S. and G.

Growing parasitically on *Chondria clarionensis* sp. nov. Clarion Island, Mason, No. 162. Setchell and Gardner, Mar. Alg. Gulf. Calif., 1924, p. 770, pl. 28, fig. 63.

Tetrasporangial, antheridial, and cystocarpic plants were detected on *Chondria clarionensis*. They agree better with *C. sinicola* S. and G., on *Chondria acrorhizophora* in the Gulf of California, than *C. verrucæformis* Setchell and McFadden on the coast of California proper.

Family Ceramiaceæ

RHODOCHORTON (Naeg.) Emend K. M. Drew, Rev. Gen. *Chantransia, Rhodochorton,* and *Acrochætium,* 1928. Nægli, Ceram., 1861, p. 121

106. **Rhodochorton Eastwoodæ** sp. nov.

Plate 4, fig. 8

Fronds attached to the host by a single cell, epiphytic, 100-130 μ high, 1-3 (mostly 2) branches arising from the basal cell; erect branches sparsely and alternately branched, usually dichotomous at the top of the first cell, 5-7 μ diam. at the base, tapering very gradually to the apex, terminating in a very slender hair; cells 2-4 times as long as broad, with band-shaped chromatophore without pyrenoids; basal cell 8.5-9.5 μ diam.; monosporangia sessile on the lower cells of the frond, 6-7 μ wide, 9-10 μ long; other forms of reproduction unknown.

Growing on *Dictyota Masonii* sp. nov.

Type: No. 173637, Herb. Calif. Acad. Sci., collected by H. L. Mason (No. 23), in June, at **Clarion Island.**

107. **Rhodochorton Daviesii** (Dillw.) Drew

Growing on various species of algæ, e. g., Mason, Nos. 82, 83, 84, 88, 154, 191, etc., Guadalupe Island.

Drew *(loc. cit.),* p. 172. *Conferva-Daviesii* Dillwyn, Brit. Confervæ, Introduction 1809, p. 73, Supplement, pl. F.

SPYRIDIA HARVEY, *in* Hooker, Br. Fl., vol. 2, 1833, p. 336

108. **Spyridia filamentosa** (Wulf.) Harv.

Floating among other algæ. Guadalupe Island, Mason, No. 80. Harvey *(loc. cit.)*, p. 337. *Fucus filamentosus* Wulfen, Crypt. Aquat., 1803, p. 64.

A sterile plant belonging to this species, at least in the broader sense.

CROUANIA J. AGARDH, Alg. Med., 1842, p. 83

109. **Crouania attenuata** (Bonn.) J. Ag. (?)

A fragment cast up among other algæ, South Anchorage, Guadalupe Island. Mason, No. 127.

J. Agardh *(loc. cit.)*. *Batrachospermum attenuatum* Bonnemaison, *in* Agardh, Syst. Alg., 1824, p. 51, as a synonym under *Mesogloia attenuata.*

The plant referred to this species is a mere scrap, together with an occasional young plant, but they seem to indicate the presence of this species in the eastern Pacific, completing, as it were, its circuit of the warmer seas of the globe.

CALLITHAMNION LYNGBYE, Hydr. Dan., 1819, p. 123

110. **Callithamnion byssoides** Arn.

Growing on Eel Grass, Guadalupe Island, Mason, No. 89.

Arnott, *in* Hooker, Brit. Flora, vol. 2, part 1, 1833, p. 342.

Tetrasporangial, antheridial, and cystocarpic fragments occur in our collections, but no traces of "seirospores." Our plants seem to agree in all essential respects with those described by Börgesen (Algæ Dan. W. I., vol. 2, pp. 218-220, figs. 205-207, 1917) from the West Indies. It has not been reported previously for the Pacific so far as we are aware.

GYMNOTHAMNION J. AGARDH, Analecta Algol., 1892, p. 27

111. **Gymnothamnion elegans** (Schousb.) J. Ag.

Growing on rocks among other minute algæ. Mason, No. 32, Clarion Island.

J. Agardh *(loc. cit.)*. *Callithamnion elegans* Schousboe, *in* Agardh, Sp. Alg., vol. 2, 1828, p. 162.

We have only tetrasporangial material, but that seems characteristic, although confusion with *Ptilothamnion Pluma* (Dillw.) Thuret is possible. The species has been known hitherto from the Mediterranean and the West Indian areas.

ANTITHAMNION Nægeli, Neue Algensyst., 1847, p. 200

112. **Antithamnion** sp.

A few fragments among other diminutive algæ. Mason, No. 153. Guadalupe Island.

Our fragments appear to belong to the "repentes" section, with, however, only a few rhizoidal outgrowths to show this. They seem to belong to low plants, with opposite ramelli, whose basal cell is spherical and conspicuous for both its shape and its deep color. The ramelli are branched, the branchlets being long and nearly second, giving the appearance of a nearly flat-topped (pseudo-) dichotomy. Bladder cells are adaxial from the basal cell of a 2-celled branchlet. It seems nearest to *Antithamnion antillarum* Börg., but the branching of the ramelli is not clearly alternately bipinnate. These notes will serve to call attention to it.

GRIFFITHSIA Agardh, Syn. Alg. Scand., 1817, p. 281

113. **Griffithsia** sp.

A few fragments cast ashore among other small algæ. Mason, No. 53, South Anchorage, Guadalupe Island.

We mention the existence of the indeterminable fragments of a member of this genus merely to call attention to its occurrence on Guadalupe Island.

PLEONOSPORIUM Nægeli, Ceram., 1861, p. (105) 342

114. **Pleonosporium sacchoriza** sp. nov.

Plate 10, fig. 39

Fronds monosiphonous, uncorticated, consisting of an extensive, branched, creeping portion attached by numerous rhizoids from below penetrating the host, and of erect fronds arising from the creeping portion; erect fronds 2-3 mm. high, subdichotomously branched, 26-30 μ diam. at the base, taper-

ing but very slightly to the blunt apices; cells 8-12 times as long as the diam. rhizoids prolonged, single cells 300-500 μ long, very much swollen in the middle, terminating in an irregularly saccate swelling; polysporangia sparse, 2-3 arising on short branches in the lower parts of the frond, single above, spherical to slightly elongated, on 1-celled pedicels, 75-85 μ diam., with approximately 32 spores, and with thick cell-walls; cystocarps and antheridia unknown.

Growing on *Codium* sp.

Type: No. 173630, Herb. Calif. Acad. Sci., collected by H. L. Mason (No. 37), in April, at **Guadalupe Island.**

We place this plant under *Pleonosporium* because of the general habit and the occurrence of polyspores in the tetrasporangium. It is distinguished because of its saccate rhizoids penetrating among the utricles of its host.

CERAMIUM AG., Syn. Alg. Scand., 1817, pp. XXVI and 60

115. **Ceramium Evermannii** sp. nov.

Plate 8, figs. 28 and 29

Fronds 4-6 cm. high, flaccid, 390-410 μ diam. in the basal region; main branches dichotomous, arising by longitudinal splitting of the apical cell, with numerous proliferous branches of limited growth arising from the large nodal cells; apices forcipate and much incurved; cells of the axial filament 1.5-2 times as long as broad below, slightly swollen at the lower end; corticating bands at the nodes wide, covering about three-fourths of the internode below, almost completely covering them in the ultimate ramuli; the corticating bands asymmetrical with respect to the nodes, considerably more than half being below and composed of close-fitting, approximately isodiametric cells, forming about four fairly well defined whorls, while the upper part of the band is composed of cells much elongated vertically and without definite arrangement into whorls; trichoblasts long, numerous, bulbose at the apices when young; tetrasporangia immersed within the band, arising on all sides, 55-65 μ diam.; cystocarps and antheridia unknown.

Among other small algæ.

Type: No. 173621, Herb. Calif. Acad. Sci., collected by H. L. Mason (No. 82), in April, at **Guadalupe Island.**

This seems to be a very distinct species of the group, having the corticating band limited and truncate below and less definite in extending well over the internode above and with the lower internodes lageniform. It is related to *C. fruticulosum* Kuetz. and to *C. corticulatum* Kylin.

116. **Ceramium transversale** Collins and Hervey

Plate 7, figs. 23 and 24

Growing on Eel Grass, Guadalupe Island, Mason, No. 155.
Collins and Hervey, Algæ Bermuda, 1917, p. 145.

Our plant is somewhat more slender than the plant of Collins and Hervey, with the corticating band more delicate, but the details of cell arrangement at the nodes and the tetrasporangia associate it with this species. The type is from Bermuda (Phyc. Bor.-Am., No. 2049). It occurs also in the West Indies and has been collected on the coast of southern California (Phyc. Bor.-Am., No. 2150). Our plant resembles more closely the Bermuda plants than those of southern California.

117. **Ceramium clarionensis** sp. nov.

Plate 7, figs. 26 and 27

Creeping fronds attached by long, slender, more or less branched, multicellular rhizoids; erect fronds short, 2-4 mm. high, 175-190 μ diam. at the base, regularly and dichotomously branched, with circinate-forcipate apices; cells of central filament slightly longer than broad at the base, diminishing in length gradually upward; nodal cells composed of a single band of large cells in the center of the band, cutting off above and below a single band of smaller cells, each of these in part and in turn giving rise to a small angular cell from the side, upper cells of the band giving rise to a whorl of stiff trichoblasts 30-35 μ long, terminated by a spherical cell; chromatophores in the nodal cells parietal and discoid, those in the axial filament very slender, 2-3.5 μ diam., mostly simple, extending from the ends and meeting in the equatorial region;

tetrasporangia 65-75 μ diam., protruding, usually three at each node on the abaxial side of the filament, the tetraspores in each sporangium subtended by one or two short bracteate filaments growing within the sporangial wall; antheridia numerous, surrounding the nodes, 1.5 μ diam.; cystocarps borne in the axils of the dichotomies, naked, variously lobed.

Growing on *Codium simulans*.

Type: No. 173620, Herb. Calif. Acad. Sci., collected by H. L. Mason (No. 75), in June, at **Clarion Island.**

This is a species of the *Stenogonia* section of *Ceramium*, apparently approaching *C. australe* Sonder, but the tetrasporangia in our plant are not on the older *"genicula,"* are 65-75 μ in diameter, and the geniculum at bearing is about 200 μ, whereas J. G. Agardh states (Anal. Algol., Cont. II, 1894, p. 16) that the tetrasporangia nearly equal the diameter of the geniculum in *C. australe*.

118. **Ceramium personatum** sp. nov.

Plate 6, figs. 21 and 22

Fronds 8-15 mm. high, attached by a small base, 110-120 μ diam. in the lower parts; segments two times as long as broad in the lower parts, diminishing gradually toward the apices; branching dichotomous, with only slightly incurved apices; nodal bands narrow, slightly wider in the lower segment than in the upper, very slightly projecting beyond the internodal cells, with smooth, even margins above and below, larger cells below and smaller cells above the center, some of the large cells of the nodal bands in the lower, older parts of the frond giving rise to descending appendages within the internodal cells; tetrasporangia projecting on the abaxial side of the several dichotomies, 1-2 at a node, without bracteate filaments, elongated, somewhat stipitate, and asymmetrical, 75-85 μ long; cystocarps and antheridia unknown.

Growing on other algæ.

Type: No. 173622, Herb. Calif. Acad. Sci., collected by H. L. Mason (No. 83), in April, at **Guadalupe Island.**

The primary tetraspores in our specimen are about one quarter to one half immersed, but the secondary are fully

naked and short pedicellate. There is some agreement between the Guadalupe specimens and those we described from the Gulf of California under the name of *C. caudatum*, but the shape of the internodal cells, the more simple type of corticating band, and the somewhat less "caudate" tetrasporangia seem to indicate the necessity of keeping them distinct from one another.

119. **Ceramium affine** sp. nov.

Fronds 8-12 mm. high, 30-38 μ diam. at the base, not tapering perceptibly except 2-3 nodes at the apices, dichotomously branched throughout, free from proliferating branches, attached by penetrating, unbranched rhizoids from the lower prostrate portion, forked apices straight to slightly incurved; internodal cells cylindrical, with short-conical ends, 30-38 μ diam. below, 24-28 μ above, 4-6 times as long as broad; corticating bands narrow, composed of 2-3 rows of rounded cells. the larger cells below the upper smaller ones cut off from these; antheridia in whorls on the terminal and subterminal ramuli, arising from all of the nodal cells; cystocarps and tetraspores unknown.

Growing on *Codium simulans* S. and G.

Type: No. 173642, Herb. Calif. Acad. Sci., collected by H. L. Mason (No. 36), in April, at **Guadalupe Island.**

At first sight, this species seems to resemble *Ceramium fastigiatum* var. *flaccidum* H. E. Petersen of the West Indies, but the lower cells of the Guadalupe plant are neither so long nor so wide as in the West Indian and the tetrasporangia are completely naked with bracteoid filaments below them. The corticating bands in ours are more regular. It seems best to separate it from the West Indian variety and also from the type of *C. fastigiatum* as now generally limited.

120. **Ceramium ornatum** sp. nov.

Fronds approximately 4 cm. high, the main axes approximately 130 μ diam., sparsely and dichotomously branched, with occasional proliferous ramuli and all tapering gradually toward the apices, slightly swollen at the nodes; cells of the

axial filament cylindrical, 1-1.5 times as long as broad; nodal band extending beyond the surface of the axial filament, relatively narrow, equally distributed above and below the node, composed of one whorl of deep-seated, large cells cutting off above and below usually one whorl each of smaller, more or less globular cells, these in turn giving rise to numerous, small, angular, surface cells, irregularly placed and giving rise to numerous, long, narrow, 4-5 μ diam., trichoblasts; tetrasporangia beginning to form near the base of the main filament and extending throughout the entire system of branches to the ultimate ramuli, scattered more or less all the way around the filament at the nodes but mostly in two groups on opposite sides of the filament, naked, projecting upward from the upper half of the band, not subtended by bracteate filaments, 60-65 μ wide, 80-90 μ long; cystocarps and antheridia unknown.

Growing on Eel Grass, cast ashore.

Type: No. 173632, Herb. Calif. Acad. Sci., collected by H. L. Mason (No. 191), in April, at **Guadalupe Island.**

A much more robust plant than either *C. caudatum* S. and G. from the Gulf of California or *C. personatum* described in this account. The cortical bands are much more complex and the three species form a small group of the *Acrogonia* closely related to *C. gracillimum* Harv. and *C. penicillatum* Aresch. but differ from them essentially in their completely naked and more or less pedicellate tetrasporangia.

121. **Ceramium** sp. nov.?

Plate 7, fig. 25

A *Ceramium,* apparently of the *C. strictum* assemblage, but lacking cystocarps, antheridia, and tetrasporangia, occurred in an admixture from Guadalupe Island (Mason, no. 127). The drawing (plate 7, fig. 25) shows well the structure, except that the abundant long hairs of the upper nodes are not represented. The older internodes are 230-239 μ in diameter and are slightly longer than broad. The corticating bands are soon narrow and well separated from one another, showing a median, but irregular row of large cells with 2 to 3 layers of outer smaller cells. There are present in each corticating band

a number of deeply colored cells which grow outward through the cuticular covering. They may be suspected of being monospores, since their contents are granular, but possibly they may be trichome structures, either young or of arrested development. We have not previously observed any such structures in any species of *Ceramium*. Since the material is scanty and sterile, it does not seem desirable to give the plant a name, but content ourselves with calling attention to its peculiarities.

Intermingled with other filamentous algæ under no. 127. Mason, no. 169. Guadalupe Island.

Family Nemastomaceæ

122. **Clarionea** gen. nov.

Fronds very soft, gelatinous, difform, of seemingly central mass approaching globular or obpyriform with cylindrical, possibly once or twice dichotomously lobed projections; central jelly traversed loosely by slender branched filaments giving rise toward the surface to an anticlinal layer of loosely placed, short, dichotomously branched, moniliform filaments; cystocarps in the cortical layer occupying a pyriform jelly-lined cavity, consisting of gonimolobes arising from a central group of small cells and surrounded by bracteoid filaments; carpogonia not seen; auxiliary cells intercalary dolioform, between two or three cells, each of which gives rise to crowded short bracteoid filaments; conjugating tubes (?) slender, seemingly fusing with the auxiliary cells, after which the auxiliary cell buds off a short rounded cell giving rise to the compact gonimolobes; antheridia and tetrasporangia unknown.

123. **Clarionea Masonii** sp. nov.

Plate 9, figs. 34 to 38

Cystocarps about 85 μ in diameter, compact, rounded angular, indistinctly 4 or 5 lobed.

Pinkish, softly gelatinous algæ growing on a crustaceous coralline.

Type: No. 173640, Herb. Calif. Acad. Sci., collected by H. L. Mason (No. 30), in June, at **Clarion Island.**

Clarionea occurred to us in the form of a single rather shapeless mass of jelly, originally of a light red color (teste Mr. Mason), extremely and softly gelatinous, in fact almost mucilaginous. The details of structure were difficult of determination and an exact idea of the habit (specimens preserved in dilute alcohol) was impossible. It seems to belong to an undescribed genus of the Nemastomaceæ, near to *Platoma,* but the bracteoid filaments of the cystocarps separate it from that genus as well as from any other of the family. The thallus also seems to be different in habit.

Family Squamariaceæ

PEYSSONELLIA Decaisne, Pl. Arab., 1841, p. 168

124. **Peyssonellia rubra** (Grev.) J. Ag.

Covering coralline nodules. Mason, Nos. 210, 232, Northeast Anchorage, Guadalupe Island.

J. Agardh, Sp. Alg., vol. 2, 1851, p. 502. *Zonaria rubra* Greville, *in* Linn. Trans., vol. 15, 1827, p. 340, pl. 3, fig. 3.

The material, while abundant, is mostly sterile but the tetrasporangial specimens show it to be of this widespread species. While the plants of the East Indies lack rhizoids (cf. Weber-van Bosse, Siboga Exp., Mon. 59b, 1921, p. 271, fig. 89) and differ in this way from the plant of Europe, our specimens and those we have collected elsewhere in the Pacific Ocean show abundance of them.

Family Corallinaceæ

CHOREONEMA Schmitz, Syst. ueber Florid, 1889, p. 455

125. **Choreonema Thureti** (Born.) Schmitz

Growing parasitically on *Corallina cubensis* (?). Mason, No. 184, Guadalupe Island, April.

Schmitz *(loc. cit.). Melobesia Thureti* Bornet, *in* Thuret and Bornet, Etud. Phyc., 1878, p. 96, pl. 50, figs. 1-8.

Testrasporangial, antheridial, and cystocarpic specimens were found in this interesting parasite, first detected in the Atlantic-Mediterranean region, but now known to extend well over the Pacific Ocean (Australia, Polynesia, Japan).

FOSLIELLA M. A. HOWE, *in* Britton and Millspaugh, Bahaman Fl., 1920, p. 587

126. **Fosliella paschalis** (Lemoine) comb. nov.

Forming whitish or pinkish circular or irregular thin crusts on leaves of *Zostera* (?) and of larger algæ. H. L. Mason, No. 50, on the sporophylls of *Eisenia* (?), Guadalupe Island; No. 93, on *Laurencia Masonii,* Guadalupe Island; No. 192, on *Zostera* (?).

Melobesia paschalis Lemoine, Corallinaceæ *in* Börgesen Mar. Alg. Easter Island, 1920, p. 289, fig. 32, f, g.

M. A. Howe (1920, p. 587) has called attention to the fact, hitherto overlooked or disregarded, that Lamouroux first described the genus *Melobesia* in 1812 (p. 186) and selected as species belonging to it the *Corallina membranacea* Esper, *Melobesia verrucata,* and *M. orbicularis* Lamouroux. So far as we are aware, the last species was never described and the first two are identical. The genus *Melobesia,* therefore, was founded on *M. membranacea* Lamour. and has soriform conceptacles. It is identical as to type species with the genus *Epilithon* Heydrich. For the species with true conceptacles with a single large central and one-layered thallus. Howe established a new generic name, *Fosliella.* It seems best to adopt this name, although it may at some time seem desirable, since the type species is *Melobesia farinosa* Lamour., to restrict it to those having heterocysted thalli. Of such, there are at present only two described species, *Fosliella farinosa* (Lamour.) M. A. Howe and *F. paschalis* (Lemoine) comb. nov. The latter is to be distinguished from the former by its smaller tetrasporangial conceptacles (112-160 μ in horizontal diameter). The plants of *Melobesia farinosa* of the Pacific Ocean, including the f. *mauritiana* Foslie, are probably to be referred to *F. paschalis.*

LITHOLEPIS FOSLIE, New Litho. 1905, p. 5

127. **Litholepis accola** Foslie

Forming superposed crusts with *Peyssonellia rubra* over *Lithothamnion validum* Foslie and f. *crassiusculum* Foslie. H. L. Mason, No. 28A, Guadalupe Island; No. 210, Clarion Island.

Foslie, Algol. Notiser, III, 1907, p. 22.

We have quoted only two numbers, although superposed crusts are frequent in our material, because in each of these two numbers conceptacles (empty) are present. Our specimens agree with the conception of Lemoine *(in* Börgesen, Marine Algæ of Easter Island, p. 289). The species is probably widespread in the tropical Pacific area.

LITHOPORELLA Foslie, Algol. Notiser, VI, 1909, p. 58

128. **Lithoporella pacifica** (Heydr.) Foslie

Forming superposed thin crusts with *Peyssonellia rubra* over *Lithothamnium validum* f. *crassiusculum* Foslie. H. L. Mason, Nos. 219, 225, 229, Clarion Island. Foslie, *(loc. cit.),* p. 59; *Melobesia pacifica* Heydrich, Lith. Mus. Paris, 1901, p. 529.

This species resembles the last in having its thin crusts superposed, but differs in having vertically elongated cells and huge conceptacles. It is a question as to whether *Lithoporella,* which resembles more closely *Mastophora* and *Litholepis,* which resembles more closely the non-heterocysted species of *Fosliella,* may be kept separate or may better be united. Unfortunately, our specimens are sterile and are assigned only provisionally to *L. pacifica.*

LITHOTHAMNIUM Phil., *in* Wiegm., Arch., vol. 1, 1837, p. 387 (*lim. mut.*)

129. **Lithothamnium validum** Foslie

Very abundant in collections from a few fathoms in the form of nodular calcareous pebbles. H. L. Mason, Nos. 201, 202, 205, 208, Guadalupe Island; Nos. 210 to 232, Clarion Island.

Foslie, Algol. Notiser, II, 1906, p. 10.

Forming thinner or thicker expansions, either flat or building up nodules up to 3-5 cm. in longer diameter. There is great variation in thickness, character of surface, branching, etc., indicating either great variety in age or development or possibly in specific or varietal segregation. The thinnest crusts resemble *Lithothamnium simulans* Foslie, the thicker ones usually have short knob-like projections and these pass over

into erect branching forms. When growing in nodular free thalli, the crusts are often rugose-nodose. Possibly there are two species awaiting detection and segregation, the type of *L. validum,* restricted to the branching form, and the f. *crassiusculum* (Foslie), restricted to the rugose-nodose form. We hope later to be able to throw more light on these variants through a study of the forms of the Californian coast.

AMPHIROA Lamouroux, Nouv. Bull. Sci. Soc. Philom., vol. 3, 1812, p. 186

130. **Amphiroa fragilissima** (L.) Lamour.

A few slender fronds with lateral conceptacles, seemingly cystocarpic. H. L. Mason, No. 67, Guadalupe Island.

Lamouroux, Hist. polyp. coral, flex., 1816, p. 298. *Corallina fragilissima* Linnæus, Syst. Nat., Ed. 12, vol. 1, 1767, p. 1305.

A slender variety, 286-428 μ in thickness, with joints very slightly swollen and with truncate, barely convex tips. It is not typical of the species but seems nearest to it of any described.

Since the preceding paragraph was written Mme. Lemoine (Arch. du Mus. d'hist. nat., ser. 6, vol. 4, pp. 78, 79, pl. 4, f. 1, 1929) has described an *Amphiroa annulata* from the Galapagos Islands. In microscopic structure, particularly in the fairly regular alternation of 3 transverse rows of long cells with 1 row of short cells, in the central axis, and in the very slightly, if at all, swollen extremities of the internodes, the Guadalupe plant is in agreement with *A. annulata,* but it does not show annulation nor branching so irregular as Lemoine's species which resembles *A. anastomosans* W.-v. Bosse in these respects. We feel it wise to retain our specimens under *A. fragilissima,* using the name in broad sense, until careful study may indicate the extent of influence of external changes of environment on modifying the characters brought forward for separation.

CORALLINA Linnæus, Syst. Nat, 1758 (ed. 10), p. 805

131. **Corallina cubensis** (Mont.) Kuetz.

In tufts, on other algæ. H. L. Mason, No. 12, Guadalupe Island. Kuetzing, Tab. Phyc., VIII, 1858, p. 37, pl. 77; *Jania cubensis* Mont., *in* Kuetzing, Spec. Alg., 1849, p. 709.

Our plants very closely resemble Kuetzing's figures c, e, and f of plate 77 of volume 8 of the Tabulæ Phycologicæ. They differ decidedly in detail from the figures of Börgesen (1917, figs. 174-178) and from the plants distributed by M. A. Howe from the Bahama Islands, but may represent a more sparsely pinnulated form. Mason's plants do not decrease so suddenly in passing from the main axes to the pinnules as do the plants of Börgesen and Howe. Börgesen (Ibid, p. 187 *et seq.)* has discussed the type specimen and the admixture with *Jania adhærens.*

132. **Corallina subulata** Solander

On *Blossevillea Brandegeei.* Guadalupe Island, T. S. Brandegee. Solander, Nat. Hist. Zooph., 1786, p. 119, pl. 21, fig. B, b.

There are so many difficulties in the way of determining exactly the specimens collected by Mr. Brandegee that they must be left in considerable doubt. They resemble closely the Solander figures of *Corallina subulata.* On the other hand, our specimens approach forms usually referred to *C. Cuvieri,* especially the form figured by Kuetzing (1858, pl. 74) under *C. pilifera.*

JANIA Lamour., Nouv. Bull. des Sci., Soc. Philomat, vol. 3, 1812, p. 186

133. **Jania rubens** (L.) Lamour.

Epiphytic on various algæ. H. L. Mason, No. 182, Guadalupe Island.

Lamouroux *(loc. cit.* p. 186). *Corallina rubens* Linnæus, Syst. Nat., Ed. 10, vol. 1, 1758, p. 806.

The main joints are 36–40 μ in diameter, cylindrical, 4-5 times as long as broad, with several nodes and internodes between branches. Our plants seem to be a variety of this widespread species.

134. **Jania adhærens** Lamour.

On various algæ. H. L. Mason, No. 185, Guadalupe Island. Lamouroux, Hist. des Polyp. Coral, flex., 1816, p. 270.

The main joints are about 135 μ broad, tapering towards the base, 1 or 2 to an internode, up to about 10 times as long as broad. The axils are broad and the branches divaricate. A very common species in the warmer oceans.

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PLATE 4

Chamæsiphon clavatus sp. nov.

Fig. 1. Group of plants, × 250.

Phormidium monile sp. nov.

Fig. 2. Group of filaments, × 300.

Symploca microdonta sp. nov.

Fig. 3. Group of filaments, × 250.

Calothrix codicola sp. nov.

Fig. 4. Group of filaments, × 250.

Calothrix clausa sp. nov.

Fig. 5. Group of filaments, × 200.

Siphonocladus pusilloides sp. nov.

Fig. 6. Group of filaments, × 10.
Fig. 7. Enlarged tip of filament, × 30.

Rhodochorton Eastwoodæ sp. nov.

Fig. 8. Three plants, × 400.

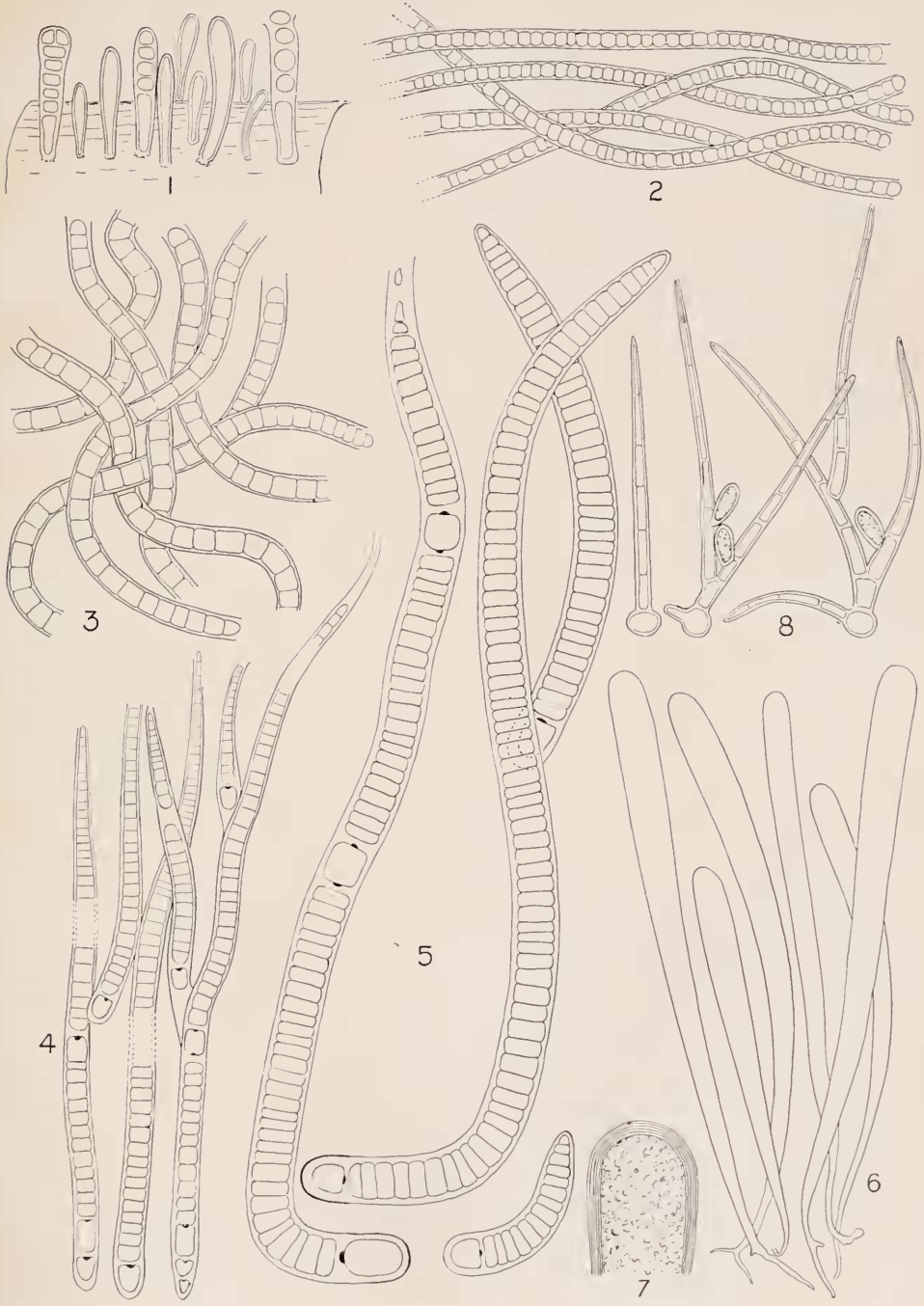
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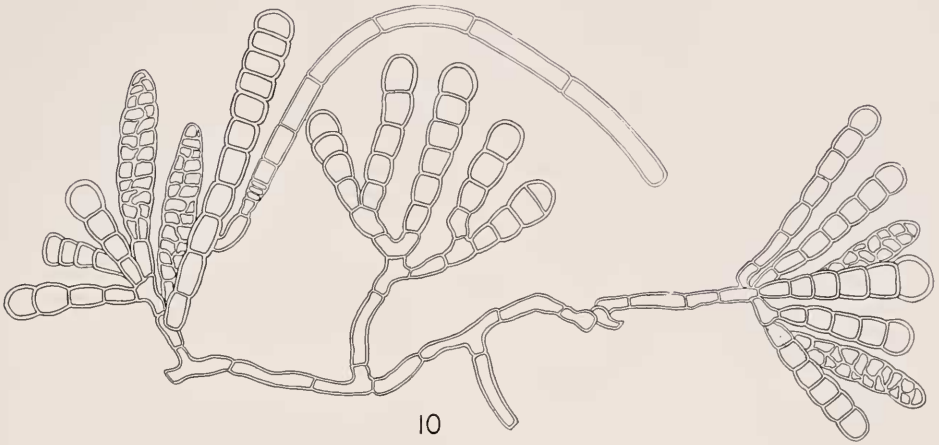
PLATE 5

Sphacelaria Masonii sp. nov.

Fig. 9. Filaments and gametangia, × 300.

Streblonema codicola sp. nov.

Fig. 10. Filaments and gametangia, × 200.



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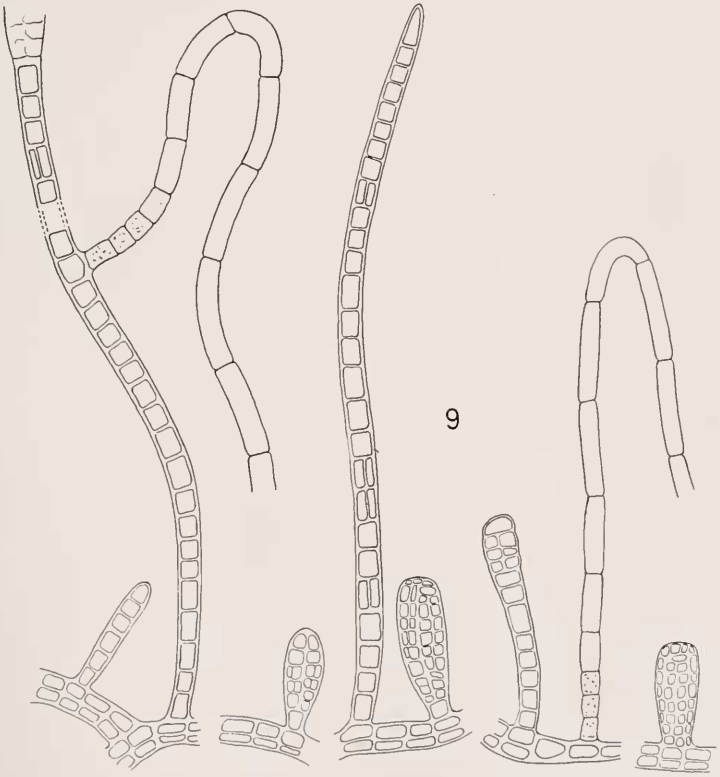

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Plate 6

Masonophycus paradoxa gen. et sp. nov.

Fig. 11. Filament with tetrasporangia, × 250.
Fig. 12. Filament with gametangia, × 250.
Fig. 13. Basal filament with erect branch, × 250.
Fig. 14. Gametangium, × 250.
Fig. 15. Gametangia, the left-hand one empty, × 250.
Fig. 16. Gametangia, the right-hand one hypertrophied (?), × 250.
Fig. 17. Similar to No. 16, × 250.
Fig. 18. Filament with progula? (or hypertrophied gametangia?), × 250.
Fig. 19. Propagulum (?), × 250.
Fig. 20. Propagulum (?), × 250.

Ceramium personatum sp. nov.

Fig. 21. Tip of filament, × 125.
Fig. 22. Portion of filament with tetrasporangia, × 125.

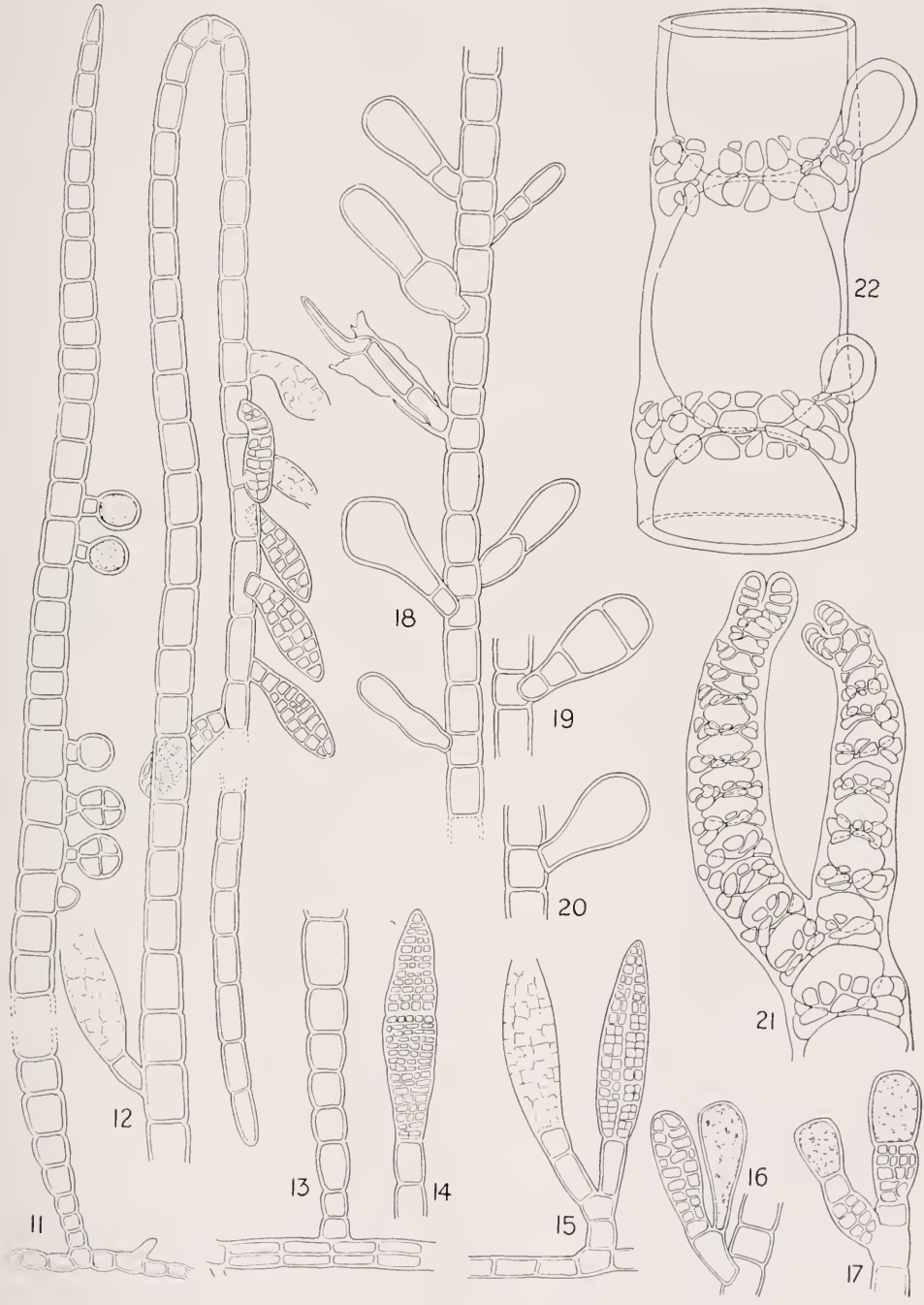
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Plate 7

Ceramium transversale Collins and Hervey

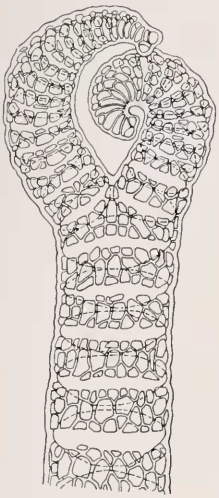
Fig. 23. Tip of filament, × 250.
Fig. 24. Portion of filament with tetrasporangia, × 250.

Ceramium sp. nov.?

Fig. 25. Portion of tip of filament showing gland (?) cells in cortex, × 150.

Ceramium clarionensis sp. nov.

Fig. 26. Tip of filament, × 125.
Fig. 27. Portion of filament with tetrasporangia, × 125.



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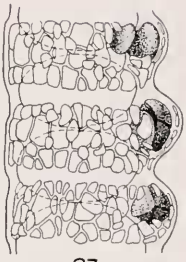

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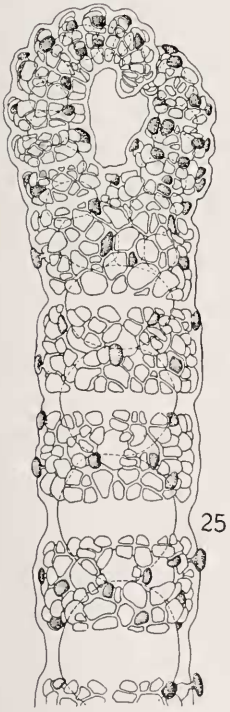

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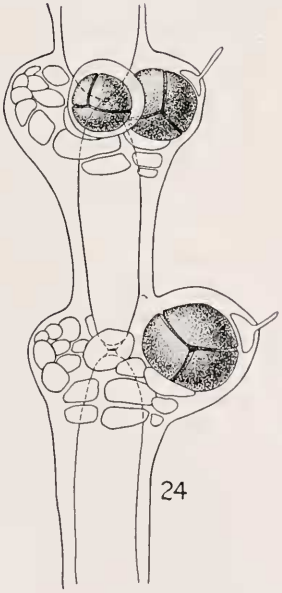

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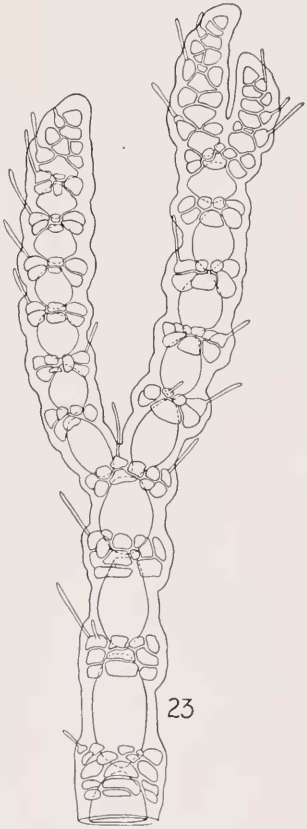


23

Plate 8

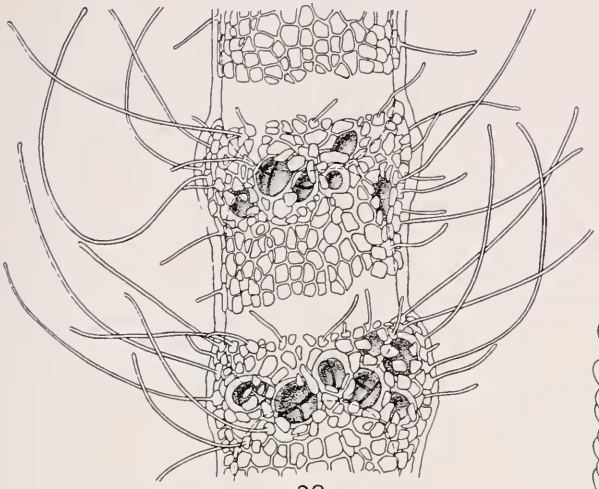
Ceramium Evermannii sp. nov.

Fig. 28. Part of upper portion of filament showing hairs and tetrasporangia, × 125.

Fig. 29. Part of lower portion of filament showing swollen nodes and arrangement of cells in cortical bands, × 125.

Laurencia sp. nov.?

Fig. 30. Portion of rhizome and branch to show papillate epidermal layer, × 200.



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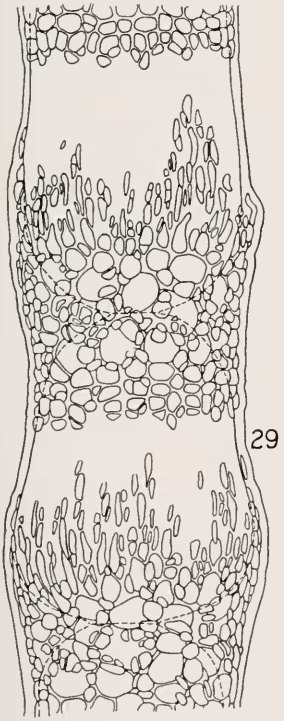

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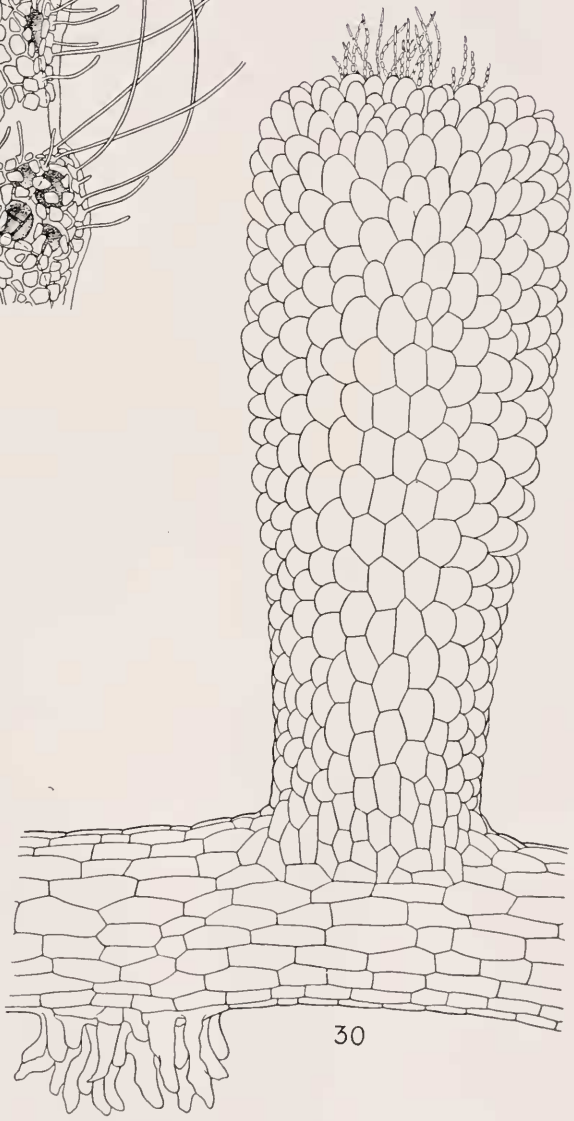


30

Plate 9

Gelidium microphysa sp. nov.

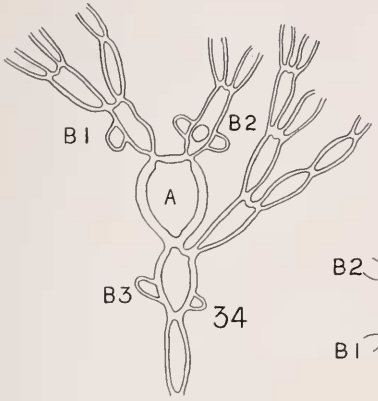
Fig. 31. Habit sketch, × 3.

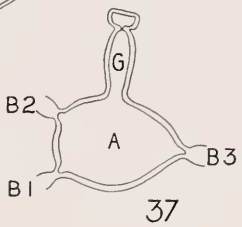
Laurencia humilis sp. nov.

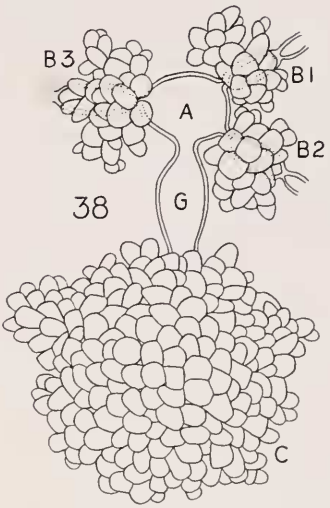
Fig. 32. Habit sketch. × 3.
Fig. 33. Cortical cell showing chromatophores, × 400.

Clarionea Masonii gen. et sp. nov.

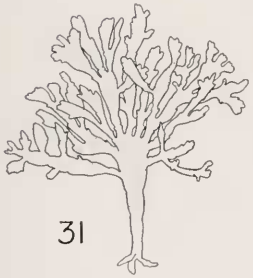
Fig. 34. Portion of branchlet with auxiliary cell, a, and bracteoid filaments starting, b1, b2, b3, × 500.
Fig. 35. Similar bracteoid filaments more advanced, × 500.
Fig. 36. Auxiliary cells, a, and glomerules of bracteoid filaments, × 500.
Fig. 37. Auxiliary cell putting forth the primary ooblastema tube, g, × 500.
Fig. 38. Similar to figure 37, with mature cystocarp, c, × 500.


B1
B2
A
B3
34


G
B2
A
B3
B1
37


B3
B1
A
B2
38
G
C


32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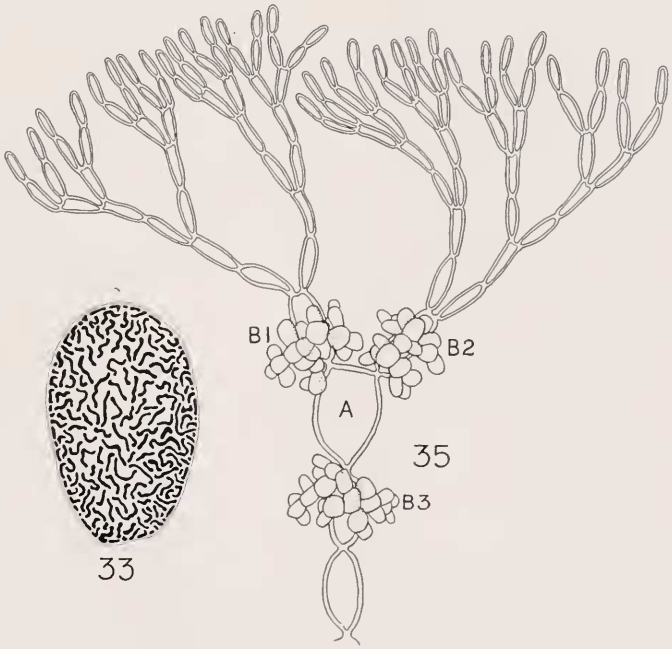
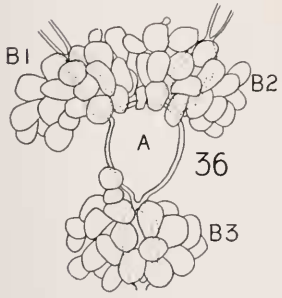

B1
B2
A
35
B3

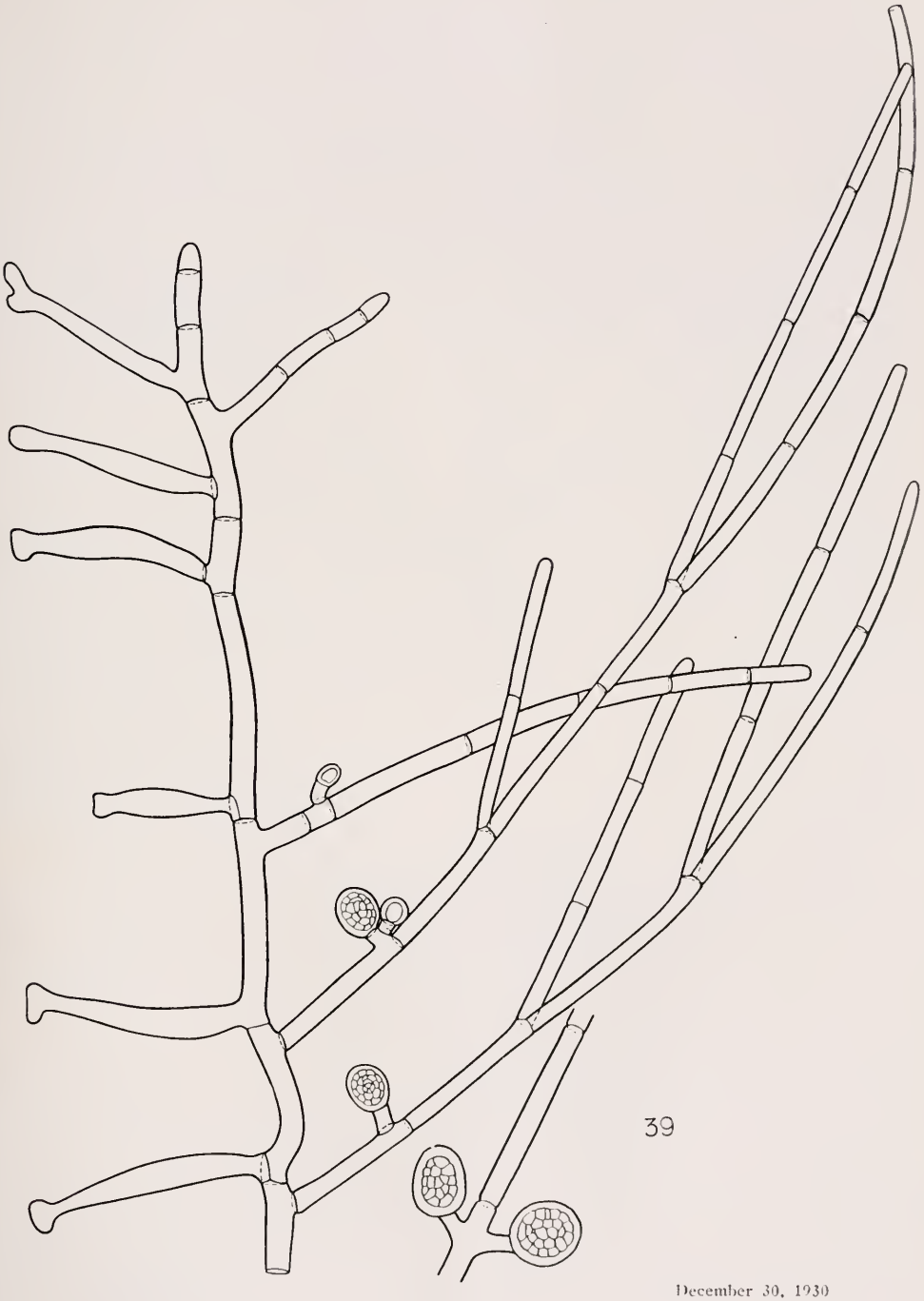

B1
B2
A
36
B3

33

PLATE 10

Pleonosporium saccorhiza sp. nov.

Fig. 39. Portion of plant showing creeping filament, saccate rhizoids, branches, and polyspores, × 75.



39

Plate 11

Dictyota cribrosa sp. nov.

Fig. 40. Habit of type specimen, × 1.

Padina tetrastromatica Hauck?

Fig. 41. Habit photograph, × 1.

Fig. 40

Fig. 41

Plate 12

Desmarestia pacifica S. and G. (?)

Fig. 42. Habit photograph, × 1.

Fig. 42

Plate 13

Sporochnus pedunculatus (Huds.) Ag.

Fig. 43. Habit photograph, × 1.

Fig. 43

Plate 14

Eisenia (?) Masonii sp. nov.

Fig. 44. Habit photograph of sporophyll (?), × 1.

Fig. 44

PLATE 15

Eisenia (?) desmarestioides sp. nov.

Fig. 45. Habit photograph of a sporophyll (?), × 1.

Fig. 45